STARMIX 4000

TECHNICAL SPECIFICATION

320 TPH FIXED ASPHALT PLANT

PLANT CAPACITY

320 TPH based on a temperature of 160 degrees C from mixer. Average moisture content of **3%**, including 3% filler and 5% bitumen in the mix. Mixer capacity of 4250 Kg per batch and a 45 second weigh/mix cycle.

260 TPH based on a temperature of 160 degrees C from mixer. Average moisture content of **5%,** including 3% filler and 5% bitumen in the mix. Mixer capacity of 4250 Kg per batch and a 45 second weigh/mix cycle.

210 TPH based on a temperature of 160 degrees C from mixer. Average moisture content of **7%**, including 3% filler and 5% bitumen in the mix. Mixer capacity of 4250 Kg per batch and a 45 second weigh/mix cycle.

Assuming the following conditions : -

1) 100% Plant utilisation

2) Ambient temperature 15^0C

3) Altitude up to 150 metres above sea level

4) Average moisture content is for surface moisture only

5) Free-flowing filler, density 1120 Kg/ m^3

6) Single sized aggregate (max. lump 40mm), density 1600 Kg/ m^3

7) Mix recipe with no excessive proportion of one size

8) Feed to contain a maximum of 35% 0 – 3mm fines

9) Gas oil calorific value 42,700kJ/kg

10) LPG calorific value 45,600kJ/kg

11) Capacities include filler and bitumen

12) Aggregate is non-porous and not excessively flaky

1 COLD FEED UNIT

1.1 HOPPERS

Hoppers	-	One six (6) compartment
Capacity	-	15 m^3 trimmed/17 m^3 heaped (each hopper)
Loading width	-	4 m
Loading height	-	4.5 m approx
Material	-	6mm thick mild steel plate
Supports	-	Of rolled steel section down to ground level
Vibrator (s)	-	Two (2) fitted to sand and dust hoppers
Guards	-	Mesh panel guards fitted along non-feed side of hoppers
Grids	-	200mm aperture
Spill plates	-	Fitted to hopper sides and back to prevent contamination

1.2 BELT FEEDERS

Feeders	-	Six (6) variable speed
Size	-	750mm wide x 1800mm centres
Type	-	Sidewall belts
Feeder body	-	Flanged for bolting to feed hopper
Radial door	-	For manual calibration
Head drum	-	Shaft mounted running in plummer block bearings
Tail drum	-	Shaft mounted running in slide bearings for belt adjustment
Belt	-	750mm wide 3 ply with vulcanised joint
Idlers	-	Flat, bolted to steel section support frame
Drive	-	3 kw AC geared motor
Turndown ratio	-	20:1

Feeder control	-	From remote operator's console. Variable speed is via AC inverter with gang control on console to vary feeder output.
Starvation switches	-	Fitted to each feeder. In the event of no-flow, an alarm is generated in the cabin.

1.3 COLLECTING CONVEYOR

Collecting conveyor	-	Horizontal, mounted under feeders
Belt	-	800mm wide 3 ply with vulcanised joint
Idlers	-	Troughed bolted to steel section support frame
Drive	-	7.5 kw gear motor unit direct on head shaft
Belt tensioning	-	Tension bolts fitted to tail drum slide bearings
Belt scraper	-	Torsion arm type fitted under head drum
Emergency grab wire	-	Fitted full length on one side
Guarding	-	Mesh panel guards fitted to drive

1.4 DRYER FEED CONVEYOR

Feed conveyor	-	From collecting conveyor to dryer
Belt	-	800mm wide 3 ply with vulcanised joint
Idlers	-	Troughed bolted to steel section support frame
Drive	-	11 kw geared motor
Belt tensioning	-	Tension bolts fitted to tail drum slide bearings
Belt scraper	-	Torsion arm type fitted under head drum
Emergency grab wire	-	Fitted full length on both sides
Guarding	-	Mesh panel guards fitted to drive

2 ROTARY DRYER

2.1 DRYER

Capacity	-	340 tph
Diameter	-	2.8 metres
Length	-	10 metres
Thickness	-	15mm welded steel plate

Lifters	-	Replaceable folded steel plate
Roller paths	-	Machined on all faces on heat expansion Z brackets
Support rollers	-	Nylon running on shafts mounted in plummer block bearings steel supported on dryer chassis
Thrust rollers	-	Nylon running on shafts mounted in plummer block bearings supported on dryer chassis
Feed end box	-	Fabricated in 6mm mild steel with flanged connection for dust collection
Discharge end box	-	Fabricated in 8mm mild steel with lined chute to elevator and housing discharge paddle ring
Insulation	-	50mm thick mineral wool with galvanised steel cladding
Drive	-	Four (4) x 30 kw gear motor units. Friction drive via support rollers
Guard fence	-	2 metre high peripheral fence to enclose the dryer section and dryer feed conveyor including personnel access gate and 3 m wide double hinged gate, both fitted with an electric safety lock

2.2 DRYER PYROMETER

Temperature sensor	-	Pyrometer mounted in dryer discharge chute to record aggregate discharge temperature with indicating temperature on VDU

2.3 DUEL FUEL BURNER

Type	-	RAX JET 4 dual fuel, gas oil and LPG fired with flame failure detection and radial blade control. Suitable for Gas oil, heavy fuel oil (pre-heated) and LPG
Fuel capacity	-	Gas oil - 2000 Kg/h (calorific value 42,700 kJ/kg)
	-	LPG - 1870 m3/h (calorific value 45,600

	-	kJ/m3)
Thermal output	-	23,720 kW, maximum
Turn down ratio	-	Gas oil 8:1, LPG 6:1
Control	-	Remote control from operators console
Ignition	-	Propane and spark ignition electrodes
LPG delivery	-	By customer, to be in liquid form and delivered via a separate pump at 10 bar.
Gas oil fuel piping	-	Between fuel pump and burner and including pressure relief valve and filter
Fuel pump motor	-	7.5 kw
Blower motor	-	45 kw

2.4 COMBUSTION HEAD

Comprising	-	Steel casing for mounting to the burner support with track permitting easy removal for inspection and maintenance
	-	Adjustable combustion air-flow regulators
	-	Gas pilot with electric ignition
	-	Multi jet LPG vaporising nozzle assembly
	-	High temperature resistant swirl plate
Flame detection	-	Photo-cell, ultraviolet

2.5 BURNER CONTROL

Flame adjustment	-	Electric servo-assisted modulator
Air flow	-	Double cam arrangement for control of air/gas and air/fuel oil ratio
Gas oil control	-	Regulator fitted
LPG flow control	-	Valve regulated via servo motor
LPG safety	-	Main shut off valve, gas pressure gauge, two (2) magnetic shut off valves, gas pressure monitor (max-min) and emergency shut off valve included

2.6 BURNER COMPRESSOR

Compressor	-	Single 11 kw to give 7 bar to burner nozzle and dryer discharge pyrometer

Note

Client is responsible for providing a LPG supply at 10 Bar pressure with a delivery rate of 2,000Nm³/h and all necessary gas safety equipment.

3 SCREENING AND MIXING TOWER

Modular construction tower with external galvanised platforming and access stairways from ground level to screen level with galvanised ladder provided to elevator head. Mixer discharge height 4 m above ground level**.**

3.1 HOT STONE ELEVATOR

Elevator	-	Totally enclosed
Capacity	-	340 tph
Bucket width	-	700 mm replaceable steel buckets
Chain	-	Twin strand, 19 m centres
Drive	-	30 kw motor via reduction gearbox with backstop
Soft start	-	Fitted to provide controlled start up
Casing	-	Fabricated in 3mm and 6mm mild steel plate with inspection doors at head and tail
Discharge	-	Chute to screen
Tensioning	-	Spring tensioning on tail shaft

3.2 SCREEN BYPASS

Screen bypass	-	Chute to screen incorporating two way pneumatically operated flap door and chute to bypass screen and discharge “all in” material into one (1) independent hot stone bin compartment

3.3 SCREEN

Capacity	-	320 tph
Size	-	2.2 m wide x 4 m long x 5 decks to give five (5) sizes plus rejects
Drive	-	Two (2) x 15 kw motors
Dust sealing	-	Totally enclosed in a fabricated steel enclosure with removable panels
Insulation	-	Side walls, roof and doors of screen dust enclosure insulated with mineral wool and clad with steel panels
Screen meshes	-	Access gained from removable discharge chutes and hinged doors in dust enclosure

3.4 OVERSIZE/REJECT DIVERTER CHUTE

Diverter chute	-	Pneumatically operated diverter chute to facilitate either discharging of oversize/reject aggregate to ground or transfer to bin five (5)

3.5 STORAGE HOPPER

Hot stone bins	-	Five (5) compartment, 60 tonne capacity
Plate thickness	-	6mm steel plate
Outlet doors	-	Pneumatically operated radial type twin rams for coarse and fine discharge control
Overflow/rejects	-	Chute provided down to ground level
Level indicators	-	Continuous level type
Insulation	-	75mm thick mineral wool with galvanised steel cladding to vertical faces

3.6 AGGREGATE WEIGH HOPPER

Capacity	-	4250 Kg load cell mounted
Load cells	-	Four (4)
Plate thickness	-	6mm steel plate
Discharge doors	-	Twin, semi-rotary, pneumatically operated

Dust sealing	-	Via high temperature resistant rubber

3.7 FILLER WEIGH HOPPER

Capacity	-	900 Kg load cell mounted
Load cells	-	Three (3)
Plate thickness	-	3mm steel plate
Discharge door	-	Pneumatically operated butterfly valve
Dust sealing	-	Via high temperature resistant rubber

3.8 BITUMEN WEIGH HOPPER

Capacity	-	650 Kg load cell mounted
Load cells	-	Three (3)
Plate thickness	-	3mm steel plate
Heating	-	Hopper fully insulated and electrically heated
Discharge	-	Bitumen delivered into mixer via pipework and spray bar over mixer

3.9 PADDLE MIXER

Mixer body	-	Fabricated from 10mm thick steel plate
Paddle shafts	-	Twin contra-rotating shafts in plummer block bearings
Capacity	-	4250 Kg
Body liners	-	Abrasive resistant segmented for ease of replacement and full utilisation
Discharge door	-	Semi rotary, pneumatically operated by two heavy-duty cylinders, wear resistant liners bolted to door
Paddle arms	-	Manufactured from cast steel with replaceable paddle tips made from alloy steel
Drive	-	Two (2) x 45 kw shaft mounted gear motor units with timing shaft

3.10 MIXER DISCHARGE CHUTE

Chute	-	Discharge chute mounted below mixer to guide mixed material into hot storage skip car

3.11 MIXER PYROMETER

Temperature sensor	-	Pyrometer mounted under the mixer to record discharge temperature with indicating temperature on existing VDU and computer batch print out.

3.12 PNEUMATICS

Compressor	-	Single 15 kw to give 6.5 bar
Pneumatics	-	Solenoid valves, nylon pipework and fittings

4 PRIMARY AND SECONDARY DUST COLLECTION TC 560

4.1 CAPACITY -

Dryer	101,400 m^3/hr	(59,650 cfm)
Nuisance	15,725 m^3/hr	(9,250 cfm)
Silo vent	1,700 m^3/hr	(1000 cfm)
Total	118,825 m^3/hr	(69,900 cfm)

4.2 FIRST STAGE

First stage	-	Primary inertial skimmer separator and hopper
Outlet	-	Continuously discharging coarse dust into elevator feed boot via 7.5 kw inclined screw conveyor and gravity flap valve

4.3 SECOND STAGE

Second stage	-	Reverse air cleaning type bag filter
Filter medium	-	Aramid 400g/sq m (560 double bags)
Filter area	-	1,372 sq m
Filtration velocity	-	1.44 m/min
Emission level	-	Less than 20mg/cu m provided the filter is maintained in accordance with our operating instructions

4.4 FILTER CABINET

Filter cabinet	-	Top section fabricated from 3mm and 5mm mild steel plate mounted on mid-section
Plenum plate	-	5mm thick with laser cut holes for positive bag sealing
Filter mid section	-	Mid-section fabricated from 3mm and 5mm mild steel plate mounted on trough hopper
Insulation	-	30mm high density mineral wool with plastic coated angular profile sheeting

4.5 CLEANING

Cleaning mechanism	-	Induced reverse air type. During cleaning sequence, the mechanism opens a small number of bags to atmosphere for a short duration, to allow the exhaust fan to induce a reverse flow of air for bag cleaning. Operated by two (2) 0.75 kw geared motor.

4.6 TROUGH HOPPER

Trough hopper	-	Fabricated in 3mm steel plate fitted with 7.5 kw reversible screw conveyor to twin dust outlets
Insulation	-	50mm mineral wool with galvanised steel cladding
Level indicator	-	High level fitted in trough hopper
Additional outlet	-	Fitted to provide feed to dust conditioner

4.7 DUST TRANSFER

Screw conveyor	-	30 tph delivering collected dust from filter to reclaimed filler elevator
Drive	-	7.5 kw shaft mounted geared motor
Rotary valve	-	300mm sq with 1.1 kw geared motor

4.8 FAN UNIT

Fan unit	-	Backward inclined centrifugal
Drive	-	160 kw motor via vee ropes
Exhaust stack	-	Fabricated in 6mm thick mild steel plate with flanged sections to a height of 22 metres

4.9 DUCTING

Ducting	-	All interconnecting ducting included, also incorporating connection to dust nuisance points on the mixing section
Dryer to skimmer	-	3mm straight, 5mm bends
Skimmer to filter	-	3mm straight, 3mm bends
Filter to exhaust fan	-	3mm straight, 3mm bends
Nuisance ducting	-	3mm straight, 3mm bends

4.10 AIR VOLUME CONTROL

Inverter	-	Adjusting air volume from plant, controlled by a transducer monitoring dryer pressure
Indication	-	Inverter speed indicator mounted on remote operator's panel

4.11 BAG PROTECTION

Bag protection	-	Two temperature probes fitted in duct prior to filter to protect bags from high gas temperatures.
Indication	-	Vacuum gauge provided to indicate pressure drop across the bag filter and control the filter cleaning system.

4.12 DUST MONITOR

Dust monitor	-	Particle impingement type with sensor/transmitter head bolted to exhaust stack

	Data logging	-	Signal fed to PC control system where the average dust mg/m^3 displayed and logged for future reference

5 CONTAINERISED CONTROL HOUSE

5.1 CONTROL HOUSE

Size	-	6 m long x 2.4 m wide
Construction	-	Corrugated sheet steel clad container style
Base frame	-	Constructed from rolled steel section
Roof	-	Sheet steel. Roof void fully insulated with 50mm mineral wool
Floor	-	Wooden floor with steel bracings, covered with heavy-duty floor tiles
Walls	-	Clad internally with decorative boarding. Walls fully insulated with 50mm mineral wool
Windows	-	Three sides double-glazed
Lighting	-	Overhead fluorescent lights fitted
Heating	-	Air conditioning unit with wall mounted heater
Door	-	800mm wide access door
Power	-	Three double socket outlets

6 PLANT CONTROL SYSTEM (Located in control house)

6.1	**MOTOR PANEL**	-	With mains-in isolator switch with door interlock, control transformer and essential services enclosure with separate isolator
	Contactors	-	Combination circuit breakers/contactors
6.2	**CONTROL DESK**	-	Containing computer mimic diagram, key switch for manual/auto control, manual start/stop buttons, cold feed control, burner control and PLC weigh/mix control system

6.3 WEIGH/MIX - PC based control system consisting of the following: -

Standard PC Pentium lV-3000 with 500MB RAM, two (2) 19" flat screen LCD monitor, 80Gb hard disk, Optical Mouse, Keyboard, CD-WRITER and Modem (minimum specification). Battery back-up for uninterruptible power supply to protect the PC from power spikes etc.

Allen-Bradley 500 series PLC, supplied in a 10-slot rack, (additional racks supplied for further options).

80 column 9-pin printer.
Interconnection cables and operators manual.

7 IMPORTED FILLER STORAGE SILO

7.1 IMPORTED SILO

Silo	-	One (1) vertical imported silo
Capacity	-	60 m^3
Level indicator	-	High level
Aeration	-	At outlet cone
Vent	-	Automatic reverse air vent filter
Discharge	-	Butterfly valve and 11 kw inclined feed screw to filler weigh hopper
Fill pipe	-	Tanker fill pipe
Silo protection	-	Imported filler silo is protected via a safety system incorporating a cut off valve in the silo fill pipe with electronic high pressure switch, audio and visual alarms

8 RECLAIMED FILLER STORAGE SILO & ELEVATOR

8.1 RECLAIMED SILO

Silo	-	One (1) vertical reclaimed silo
Capacity	-	60 m^3
Level indicator	-	High level
Aeration	-	At outlet cone
Vent	-	To dust collection ducting
Discharge	-	Butterfly valve and 5.5 kw and 7.5 kw inclined feed screws to filler weigh hopper

8.2 RECLAIMED DUST ELEVATOR

Elevator	-	Fully enclosed
Position	-	Adjacent to the reclaimed filler storage silo to convey reclaimed dust from bag filter transfer screw conveyor to silo
Capacity	-	30 tph approx
Type	-	Belt and bucket with centrifugal discharge
Drive	-	5.5 kw shaft mounted gear motor with back stop
Casing	-	Fabricated in 3mm and 6mm mild steel plate with inspection doors at head and tail
Discharge	-	Chute to reclaimed filler silo
Tensioning	-	Screw tensioning on tail shaft

9 DUST CONDITIONER SYSTEM

9.1 DUST CONDITIONER

Type	-	Centrifugal type
Rotary valve	-	300mm square inlet rotary valve with 1.1 kw geared motor drive.
Conditioner	-	25 tph with 15 kw geared motor drive

Casing construction	-	Mild steel body with non stick wear resistant lining
Mixing paddles	-	Shaft mounted spiral feed zone followed by conditioning zone fitted with high strength wear resistant mixing paddles
Shaft drive	-	Single shaft driven by direct mounted gear motor
Water sprays	-	Three (3) radially mounted non - ferrous hollow spray nozzles with large openings to reduce the possibility of clogging

9.2 WATER TANK AND PUMP

Tank	-	2250 litre capacity, fully galvanised. Tank fitted with float level valve, immersion heater with frost stat, overflow and drain connections
Pump	-	Centrifugal type with 1.5 kw drive motor
Pipe work	-	Pipe work from pump to conditioner complete with pressure relief valve, flow control valve, pressure gauge, and solenoid valve

9.3 SUPPORT STRUCTURE

Structure	-	Structure from rolled steel sections with suitable bracings supporting conditioner to give 3 m high discharge and 3.5 m wide clearance for vehicle access.
Platform	-	Complete with maintenance platform with galvanised hand railing around ends and one side of the conditioner with vertical cage access ladder

9.4 RECLAIMED DUST SCREW

Dust transfer	-	From filter trough hopper to dust conditioner
Drive	-	5.5 kw shaft mounted gear motor

10 SMA FIBRE ADDITIVE SYSTEM

10.1 FIBRE PELLET SILO

Construction	-	Fabricated in mild steel of 2.9 m dia and 9 m high mounted at ground level adjacent to mixing section
Capacity	-	14 tonne based on a density of 500 Kg/m³
Location	-	Within 15 m of the mixer
Venting	-	Automatically operated venting system during silo filling process
Tanker loading	-	Fill pipe mounted at ground level to facilitate the discharge of fibre pellets from delivery tanker to silo with high level alarm
Access	-	Via galvanised vertical caged ladder with intermediate staged platform
Silo roof	-	Fitted with galvanised hand rail and kick strip around circumference

10.2 WEIGH FEED SCREW CONVEYOR

Screw conveyor	-	2.2 kw inclined screw conveyor transferring fibre pellets from silo to weigh hopper

10.3 FIBRE WEIGH HOPPER

Weigh hopper	-	Load cell mounted weigh hopper
Batch discharge	-	Via rotary valve and pneumatic conveyor transferring batch of fibre into the paddle mixer
Pneumatic conveyor	-	Centrifugal type blower with 15 kw drive motor and pneumatic transfer pipe from blower to paddle mixer

11 "WETMIX" ADDITIVE SYSTEM

11.1 DOSING PUMP

Type	-	Peristaltic type hose pump
Construction	-	Cast iron pump head and rotor
Capacity	-	4.5 LPM (Maximum 0.5% "Wetmix" dose into a 7% bitumen content mixed material batch)
Mounting	-	Galvanised steel support frame for ground mounting
Location	-	Adjacent to mixing tower structure support leg Positioned to allow gravity feed to pump inlet from storage container

11.2 CONNECTING PIPE WORK

Pump delivery	-	25mm nominal bore x 4m long flexible connecting hose from local IBC storage container to pump inlet.
Pump discharge	-	25mm nominal bore x 4m long flexible hose with suitable hose supports to connect dosing pump outlet to bitumen weigh hopper

12 200 TONNE MIXED MATERIAL STORAGE SYSTEM

12.1 MIXED MATERIAL STORAGE SYSTEM

Storage hoppers	-	Two (2) insulated hoppers fabricated from steel plate
Capacity	-	200 Tonnes split 90/110 tonnes based on a density of 1800 Kg/m^3

High level indicators	-	High level for each silo
Hopper insulation	-	150mm thick mineral wool with plastic coated cladding
Hopper inlet	-	Pneumatically operated top cover door
Hopper outlet	-	Pneumatically operated, insulated radial discharge door
Heating	-	Discharge doors heated with thermostatic controlled electric heating elements
Foul batch hopper	-	5 Tonne un-lagged hopper with radial door
Skip car	-	4250 Kg capacity mounted on flanged wheels and insulated with 50mm thick mineral wool
Skip track	-	Inclined and made from cross-braced rolled steel section.
Direct loading	-	Bottom section may be hinged up to allow direct lorry loading from paddle mixer
Winch unit	-	Inverter controlled 90 kw motor and disc brake via a reduction gearbox directly coupled to the winding drum, which is mounted on roller bearings
Skip operation	-	A pulse counter is mounted at the winch to provide skip positional information and ultimate limits are located at both ends of the track
Support structure	-	Rolled steel sections to give 4 metres discharge clearance beneath storage hoppers
Safety controls	-	Slack rope sensing beam under winch, second top ultimate cuts power to winch motor, over speed monitoring and brake wear alarm
Access gate	-	Galvanised access gate to skip walkway access mounted on one side to prevent access whilst skip is in operation. Skip and hot storage top access locked off during operation with key interlocked system

Winch guarding	-	Ground mounted skip winch unit enclosed in galvanised safety fence locked off during operation with key interlocked system to prevent access whilst skip is in operation

12. 2 PNEUMATICS

Air receiver	-	Air receiver mounted on mixed material storage structure
Pneumatics	-	Solenoid valves, nylon pipework and fittings

13 BITUMEN STORAGE SYSTEM

13.1 VERTICAL TANKS (60 TONNE)

Tanks	-	Two (2) vertical
Capacity	-	Based on the following: The specific gravity of the stored bitumen used to calculate the bitumen tank capacities as noted below are based on a specific gravity of 0.92 s.g. Nominal tank capacity 60 tonnes
Construction	-	Cylindrical construction
Material	-	Carbon steel BSEN10 025 grade Fe430B
Cylinder	-	Fabricated in 6mm
Tank base		Fabricated in 6mm
Tank roof	-	Fabricated in 5mm
Design pressure	-	Atmospheric

13.2 TANK FITTINGS

Manway	-	Bolted side and top manway
Brackets	-	Four (4) holding down brackets
Lifting lugs	-	One (1) set of lifting lugs
Fill inlet (bottom)	-	80mm NP16 bottom fill inlet
Draw off outlet	-	100mm NP16 draw off outlet
Drain outlet	-	80mm NP16 drain outlet with blanking flange

Vent/overflow	-	100mm vent/overflow pipe manufactured out of Inox material fitted to the outside of the tank
Mounting flange	-	Immersion heater mounting flange
High level switch	-	Connection for electronic high level switch
Contents gauge	-	Connection for electronic contents gauge
Earthing	-	Earthing boss
Instrument pockets	-	Three (3) instrument pockets
Fill pipe	-	80mm fill pipe with delivery hose connection flange
Drain outlet flange	-	80mm drain outlet flange located within the tank lagging and cladding to provide emergency draining point

13.3 INSULATION AND CLADDING

Insulation density	-	All surfaces are lagged with 60 Kg/m^3 high density mineral wool
Insulation	-	Tank insulated with 200mm thick mineral wool
Cladding	-	Angular plastic coated profiled sheeting

13.4 HEATING AND CONTROLS

Heating	-	Multi-bank full width flange mounted immersion heaters with nine (9) independent removable elements
Total load	-	Electric, 45 kw each
Control panel	-	Lockable IP55 cabinet with weather canopy
Glazed door	-	Lockable glazed door protecting visible instrumentation, controls and lamp indication
Panel isolator	-	125A 3-pole door isolator
Control voltage	-	110/50 volt control circuit
Controls	-	Contactors/MCCB protection for heating circuit with 24/7 digital timer fascia mounted with battery back-up
Temperature control	-	Digital bitumen temperature controller with PT100 input and 4-20mA re-transmission output

Switching	-	3-stage switching complete with set down
Thermostat	-	High temperature filled system thermostat with a range of 120-215º C
Radar level indicator	-	Tank roof mounted high level control guide wave radar level indicator
Contents display	-	Control panel mounted contents display and controller with high level warning activation
High level probe	-	Tank roof mounted capacitive high level probe with control panel test facility
Contents panel	-	Contents panel mounted at tank fill point containing contents gauge, low level lamp indication, high level siren and beacon and ultimate high level siren and beacon

13.5 MOTORIZED STIRRER

Stirrer	-	One (1) vertical motorized fluid stirrer fitted per tank, positioned on flanged mounting stool to agitate bitumen and additives in storage tank
Drive	-	One (1) 5.5 kw geared motor per tank driving via coupling to a single vertical shaft with an intermediate and bottom bronze steady bearing assembly
Shaft impellors	-	Each shaft fitted with three (3) triple blade high efficiency impellor assemblies
Seals	-	Packed gland seal arrangement contained within purpose built flanged mounting spigot

13.6 TANK ROOF ACCESS

Tank roof access	-	Via one (1) galvanised vertical caged ladder in two (2) sections with intermediate staged platform
Safety gates	-	Two (2) galvanised hinged safety gates positioned at the top of each vertical ladder section for access safety purposes

Tank roof	-	Fitted with galvanised hand rail and kick strip around circumference to provide safe access on tank roof. Platform bridge to provide access between tanks

13.7 BITUMEN PUMP

Pump	-	One (1) external, rotary gear type with electric heating
Capacity	-	48,000 litres per hour
Drive	-	15 kw motor direct coupled to pump

13.8 VALVES

Tank outlet valves	-	Three (3) 100mm manually actuated two-way valves
Safety gate valves	-	Three (3) manual gate valves for safety and maintenance purposes
Delivery valves	-	One (1) pneumatically operated three-way trans-flow valves complete with actuator to provide low level ring main for delivery and return to tanks

13.9 BITUMEN PIPEWORK

Pipework	-	Bitumen delivery pipework to bitumen weigh hopper manufactured in 100mm NB medium black tube with NP16 flanged connections
Supports	-	Pipework suitably supported
Heating	-	Via Cupro nickel 240 volt trace heating attached to the bitumen pipe work arranged in thermostatically controlled zones with clear "Power On" lamp indication
Insulation	-	25mm thick pre-formed rigid section mineral wool
Cladding	-	Aluminium cladding to pipe work with access boxes on all flanges and valves

13.10 BITUMEN FILL SYSTEM

Pump	-	One (1) independent, rotary gear type bitumen pump electrically heated, mounted on separate frame to accept tanker deliveries
Connection	-	Flange connection to accept bitumen tank delivery feed line
Selection valve	-	Manually operated, electrically heated valve to allow tanker driver to select designated tank
Capacity	-	48,000 litres per hour
Drive	-	15 kw motor direct coupled to pump
Drain valve	-	Fitted

14 PLANT LIGHTING

14.1 FLOOD LIGHTS

Hot storage	-	Two (2) 400 watt SON lamps on both sides of the loading bays
Cold feed section	-	One (1) 400 watt SON lamp on Hot elevator directed over cold feeders
Bag filter	-	One (1) 400 watt SON lamp on tower directed over filter
Bitumen tanks	-	One (1) 400 watt SON lamp on tower directed over bitumen tanks

14.3 CONTROL - The lighting will be operated via switches in the control cabin. The lights will automatically switch on at dusk by control from a light detector.

15 WIRING

Each section of plant is pre-wired for quick electrical installation on site. Motor isolation switches are fitted to all drives as required.

16 INSTALLATION AND COMMISSIONING

Delivery of the Parker StarMix 4000 asphalt plant to your South Wales site plus supplying necessary mechanical and electrical engineers to install and commission the aforementioned plant.

Inclusive of all cranage, man platforms and hand tools to undertake the above.

Customer to provide employer liability insurance for labour they supply.

GUARDS

Safety guards are provided over all V rope drives, chain drives and spur gears.

STEELWORK

All welds to be cleaned as necessary, steelwork to be wire brushed and generally cleaned of all mill scale etc before painting.

PAINTING

All external surfaces are painted with one-coat single pack zinc phosphate primer, followed by a high build semi-gloss topcoat enamel finish.

All ducting, stack and parts subject to heat are painted with heat resistant paint

Any plastic coated PVC will be self-coloured.

COLOUR

Steelwork Merlin grey

Sheeting Goosewing

Ladders, handrailing and platforms galvanised

VOLTAGE

400 Volt, 3 phase, 50 Hz

MANUALS

We include for two complete sets of operators and maintenance instruction manuals and illustrated spare parts manuals

OPTIONAL EQUIPMENT

OPTION 1

17 FREE-STANDING FEED HOPPER CANOPY OVER EXISTING HOPPERS

17.1 FREE STANDING FEED HOPPER CANOPY

Support structure	-	Free standing rolled steel section to form an independent cross-braced frame to be bolted to customers foundations to meet BSEN1090-1 requirements, to cover feed hopper section.
Hopper canopy	-	Feed unit is clad along three sides and roof with plastic coated angular profile sheeting

OPTION 2

18 ADDITIONAL SIX (6) BIN COLD FEED UNIT, GRIDS & CANOPY

18.1 HOPPERS

Hoppers	-	One six (6) compartment
Capacity	-	15 m^3 trimmed/17 m^3 heaped (each hopper)
Loading width	-	4 m
Loading height	-	4.5 m approx
Material	-	6mm thick mild steel plate
Supports	-	Of rolled steel section down to ground level
Vibrator (s)	-	Two (2) fitted to sand and dust hoppers
Guards	-	Mesh panel guards fitted along non-feed side of hoppers
Grids	-	200mm aperture
Spill plates	-	Fitted to hopper sides and back to prevent contamination

18.2 BELT FEEDERS

Feeders	-	Six (6) variable speed
Size	-	750mm wide x 1800mm centres
Type	-	Sidewall belts
Feeder body	-	Flanged for bolting to feed hopper
Radial door	-	For manual calibration
Head drum	-	Shaft mounted running in plummer block bearings
Tail drum	-	Shaft mounted running in slide bearings for belt adjustment
Belt	-	750mm wide 3 ply with vulcanised joint
Idlers	-	Flat, bolted to steel section support frame
Drive	-	3 kw AC geared motor
Turndown ratio	-	20:1
Feeder control	-	From remote operator's console. Variable speed is via AC inverter with gang control on console to vary feeder output.
Starvation switches	-	Fitted to each feeder. In the event of no-flow, an alarm is generated in the cabin

18.3 FREE STANDING FEED HOPPER CANOPY

Support structure	-	Free standing rolled steel section to form an independent cross-braced frame to be bolted to customers foundations to meet BSEN1090-1 requirements, to cover feed hopper section.
Hopper canopy	-	Feed unit is clad along three sides and roof with plastic coated angular profile sheeting

18.4 COLLECTING CONVEYOR

Collecting conveyor	-	Horizontal, mounted under feeders
Belt	-	800mm wide 3 ply with vulcanised joint
Idlers	-	Troughed bolted to steel section support frame
Drive	-	7.5 kw gear motor unit direct on head shaft
Belt tensioning	-	Tension bolts fitted to tail drum slide bearings

Belt scraper	-	Torsion arm type fitted under head drum
Emergency grab wire	-	Fitted full length on one side
Guarding	-	Mesh panel guards fitted to drive

OPTION 3

19 CONTROL HOUSE AND OFFICE

19.1 CONTROL HOUSE

Size	-	34’ long x 12’ wide
Base frame	-	Constructed from rolled steel section
Construction	-	Steel panels fitted between rolled steel sections with plastic coated exterior finish
Roof	-	Sheet steel construction with, insulated with 6” encapsulated rockfibre
Floor	-	Wooden floor with steel bracings, covered with heavy-duty floor tiles, insulated with 4” rockfibre slab, foil faced both sides
Walls	-	Clad internally with decorative boarding, insulated with 2” rockfibre slab, foil faced both sides
Room divider	-	Internal partition insulated with 2” rockfibre slab, foil faced both sides with internal door between control house and office
Windows	-	Three sides double-glazed, operators end of control house
Ticket window	-	Double sliding, glazed window on one side to allow manual issuing of tickets
Lighting	-	Overhead LED panel lights fitted per room
HVAC	-	Two (2) zonal heating and air conditioning units, one (1) per room
External doors	-	Two (2) steel access doors, one (1) per room

Power	-	Six (6) double socket outlets and four (4) single sockets

19.2 ACCESS

Access platform	-	Via galvanized platform and stairway with handrails and kick strip

OPTION 4

20 100 TONNE VERTICAL BITUMEN STORAGE SYSTEM

20.1 VERTICAL TANK (100 TONNE)

Tank	-	One (1) vertical
Capacity	-	Based on the following: The specific gravity of the stored bitumen used to calculate the bitumen tank capacities as noted below are based on a specific gravity of **0.92 s.g.** Nominal tank capacity **100 tonnes**
Construction	-	Cylindrical construction
Material	-	Carbon steel BSEN10 025 grade Fe430B
Cylinder	-	Fabricated in 6mm
Tank base		Fabricated in 6mm
Tank roof	-	Fabricated in 5mm
Design pressure	-	Atmospheric

20.2 TANK FITTINGS

Manway	-	Bolted side and top manway
Brackets	-	Four (4) holding down brackets
Lifting lugs	-	One (1) set of lifting lugs
Fill inlet (bottom)	-	80mm NP16 bottom fill inlet
Draw off outlet	-	100mm NP16 draw off outlet
Drain outlet	-	80mm NP16 drain outlet with blanking flange
Vent/overflow	-	100mm vent/overflow pipe manufactured out of Inox material fitted to the outside of the tank

Mounting flange	-	Immersion heater mounting flange
High level switch	-	Connection for electronic high level switch
Contents gauge	-	Connection for electronic contents gauge
Earthing	-	Earthing boss
Instrument pockets	-	Three (3) instrument pockets
Fill pipe	-	80mm fill pipe with delivery hose connection flange
Drain outlet flange	-	80mm drain outlet flange located within the tank lagging and cladding to provide emergency draining point

20.3 INSULATION AND CLADDING

Insulation density	-	All surfaces are lagged with 60 Kg/m^3 high density mineral wool
Insulation	-	Tank insulated with 200mm thick mineral wool
Cladding	-	Angular plastic coated profiled sheeting

20.4 HEATING AND CONTROLS

Heating	-	Multi-bank full width flange mounted immersion heaters with sixteen (16) independent removable elements
Total load	-	Electric, 80 kw each
Control panel	-	Lockable IP55 cabinet with weather canopy
Glazed door	-	Lockable glazed door protecting visible instrumentation, controls and lamp indication
Panel isolator	-	125A 3-pole door isolator
Control voltage	-	110/50 volt control circuit
Controls	-	Contactors/MCCB protection for heating circuit with 24/7 digital timer fascia mounted with battery back-up
Temperature control	-	Digital bitumen temperature controller with PT100 input and 4-20mA re-transmission output
Switching	-	3-stage switching complete with set down

Thermostat	-	High temperature filled system thermostat with a range of 120-215º C
Radar level indicator	-	Tank roof mounted high level control guide wave radar level indicator
Contents display	-	Control panel mounted contents display and controller with high level warning activation
High level probe	-	Tank roof mounted capacitive high level probe with control panel test facility
Contents panel	-	Contents panel mounted at tank fill point containing contents gauge, low level lamp indication, high level siren and beacon and ultimate high level siren and beacon

20.5 TANK ROOF ACCESS

Tank roof access	-	Via one (1) galvanised vertical caged ladder in two (2) sections with intermediate staged platform
Safety gates	-	Two (2) galvanised hinged safety gates positioned at the top of each vertical ladder section for access safety purposes
Tank roof	-	Fitted with galvanised hand rail and kick strip around circumference to provide safe access on tank roof. Platform bridge to provide access between tanks

20.6 BITUMEN PUMP

Pump	-	One (1) external, rotary gear type with electric heating
Capacity	-	48,000 litres per hour
Drive	-	15 kw motor direct coupled to pump

20.7 VALVES

Tank outlet valves	-	Three (3) 100mm manually actuated two-way valves
Safety gate valves	-	Three (3) manual gate valves for safety and maintenance purposes
Delivery valves	-	One (1) pneumatically operated three-way trans-flow valves complete with actuator to provide low level ring main for delivery and return to tanks

20.8 BITUMEN PIPEWORK

Pipework	-	Bitumen delivery pipework to bitumen weigh hopper manufactured in 100mm NB medium black tube with NP16 flanged connections
Supports	-	Pipework suitably supported
Heating	-	Via Cupro nickel 240 volt trace heating attached to the bitumen pipe work arranged in thermostatically controlled zones with clear "Power On" lamp indication
Insulation	-	25mm thick pre-formed rigid section mineral wool
Cladding	-	Aluminium cladding to pipe work with access boxes on all flanges and valves

OPTION 5

21 RECYCLED ASPHALT (RAP) SYSTEM

The recycled asphalt feed system is designed to process up to a maximum RAP feed of 20% of the plant capacity at 2% moisture. Capacities are subject to moisture content, quality of RAP material, mix cycle time, dryer and bag filter capabilities to superheat the virgin aggregates.

21.1 FEED HOPPER

Hopper	-	12 m³ capacity trimmed, steep angled
Loading width	-	4.0 metres
Loading height	-	4.1 metres approx

Material	-	6mm thick mild steel plate
Liners	-	Low-friction ultra-high molecular weight polyethylene liners are fitted to the sloping surfaces of the feed hopper
Vibrators	-	Two (2) fitted
Hopper canopy	-	Hopper clad along three sides and roof with plastic coated angular profile sheeting
Spill plates	-	Fitted to hopper sides and back to prevent contamination and also to protect sheeting

21.2 RAP BELT FEEDER

Feeder	-	Variable speed type
Size	-	650mm wide x 4 m crs. approx
Head drum	-	Shaft mounted running in pedestal bearings
Tail drum	-	Shaft mounted running in slide bearings attached to screwed rod for belt adjustment
Belt	-	650mm wide 3 ply, 4mm x 2mm covers vulcanised joint
Idlers	-	Trough type, bolted to rolled steel section support frame
Drive	-	5.5 kw AC geared motor direct coupled to feeder head shaft
Turndown ratio	-	20:1
Feeder control	-	From remote operator's console. Variable speed via AC inverter
Starvation switch	-	Fitted to feeder. In the event of no-flow, an alarm is generated in the cabin.

21.3 FREE STANDING FEED HOPPER CANOPY

Support structure	-	Free standing rolled steel section to form an independent cross-braced frame to be bolted to customers foundations to meet BSEN1090-1 requirements, to cover feed hopper section.

Hopper canopy	-	Feed unit is clad along three sides and roof with plastic coated angular profile sheeting

21.4 RAP FEED CONVEYOR

Conveyor	-	Troughed belt, inclined
Size	-	650mm wide x **40 m crs** approx
Belt	-	650mm wide 3 ply, 4mm x 2mm covers
Tensioning	-	Tension bolts fitted to the tail drum slide bearings
Idlers	-	Multi-trough 102mm dia top idlers and 100mm dia parallel bottom return idlers
Feed boot	-	6mm thick mild steel plate construction with adjustable rubber sealing strip
Belt scraper	-	Torsion arm type fitted
Drums	-	Steel construction with machined crown faces. Lagged drive drum
Drive	-	7.5 kw motorgear unit with holdback device
Conveyor frame	-	Braced steel of welded and bolted construction
Support trestles	-	Welded and bolted rolled steel sections
Head supports	-	Welded and bolted of rolled steel sections, suitably braced and tied to form supports for the conveyor head section
Covers	-	Dust/weather shielding forming roof and both sides belt protection, manufactured from galvanised sheeting to facilitate removal of side protection by one operative for maintenance purposes
Discharge chute	-	Fabricated in 6mm thick mild steel plate, discharging into bypass chute

21.5 BYPASS FACILITY

Bypass chute	-	Pneumatically operated bypass chute fabricated in 6mm thick mild steel plate to allow calibration and emptying of RAP hopper and feed conveyor via bypass discharge chute direct to truck

21.6 MIXER WEIGH FEEDER

Feeder	-	Variable speed type. Mounted on four (4) loadcells at mixer level with feed boot and enclosure to mixer housing
Size	-	650mm wide x 2.8 m centres
Head drum	-	Shaft mounted running in plummer block bearings
Tail drum	-	Shaft mounted running in slide bearings for belt adjustment
Belt	-	650mm wide 3 ply with vulcanised joint
Idlers	-	Flat, bolted to steel section support frame
Drive	-	4 kw gear motor unit direct on head shaft
Discharge chute	-	Discharge chute to mixer fitted with vibrator

21.7 SUPPORT STRUCTURE

Structure	-	Support structure to allow RAP conveyor and mixer weigh feeder to be positioned adjacent to the mixing tower
Platform	-	Platforms to allow maintenance access to RAP conveyor head section and mixer weigh feeder complete with hand railing

21.8 MIXER STEAM EVACUATION SYSTEM

Steam vent	-	Ducting from mixer cover to paddle type fan to extract steam created upon introduction of RAP material into mixer

Cut-off door	-	Pneumatically operated and solenoid controlled to close when not processing RAP materials
Ducting	-	Ducting from fan discharges into plant ducting
Extraction fan	-	With 11 kw motor, positioned outside the tower on a new platform with handrailing and access as required.

NOTE:-RAP. MATERIAL - LUMP SIZE AND AGGREGATE CONTENT

For batch production asphalt plants the feed lump size should be reduced to pass a 40mm screen aperture and the aggregate size in the RAP material must not exceed the maximum permitted size of aggregate specified for the final mixed product.

OPTION 6

22 ADDITIONAL 130 TONNE MIXED MATERIAL STORAGE HOPPER FOR EXISTING 200 TONNE MIXED MATERIAL STORAGE SYSTEM

22.1 MIXED MATERIAL STORAGE SYSTEM

Storage hopper	-	One (1) insulated hoppers fabricated from mild steel plate
Capacity	-	130 tonnes, based on a density of 1800 Kg/m^3
Level indication	-	High level for each silo
Hopper insulation	-	150mm thick mineral wool with plastic coated cladding
Hopper inlet	-	Pneumatically operated top cover door
Hopper outlet	-	Pneumatically operated, insulated radial discharge door
Heating	-	Discharge doors heated with thermostatic controlled electric heating elements
Support structure	-	Rolled steel sections to give 4 metres discharge clearance beneath storage hopper

22.2 SKIP TRACK

Skip track	-	Extension to skip track and supports to facilitate new storage bins into the existing mix material arrangement. Inclusive of additional guarding, skip stop and electrical components

22.3 PNEUMATICS

Pneumatics	-	Additional solenoid valves, nylon pipework and fittings for the bin top and bottom door operation

OPTION 7

23 210 TONNE LOADCELL MOUNTED MIXED MATERIAL STORAGE SYSTEM

23.1 MIXED MATERIAL STORAGE SYSTEM

Storage hoppers	-	Three (3) insulated hoppers fabricated from steel plate
Load cells	-	Hoppers mounted on four (4) load cells.
Capacity	-	210 tonnes split 50/70/90 tonnes based on a density of 1800 kg/m^3
Level indication	-	High level for each silo
Hopper insulation	-	150mm thick mineral wool with plastic coated cladding
Hopper inlet	-	Pneumatically operated top cover door
Hopper outlet	-	Pneumatically operated, insulated radial discharge door
Heating	-	Discharge doors and cone sections heated with thermostatic controlled electric heating elements
Foul batch hopper	-	5 tonne unlagged hopper with radial door
Skip car	-	4250 kg capacity mounted on flanged wheels and insulated with 50mm thick mineral wool

Chute	-	Discharge chute mounted below mixer to guide mixed material into hot storage skip car
Skip track	-	Inclined and made from cross-braced rolled steel section
Skip track housing	-	The skip track will be located within a steel structure with plastic coated sheeting to roof and two sides for weather protection
Winch unit	-	Inverter controlled 90 kw motor and disc brake via a reduction gearbox directly coupled to the winding drum, which is mounted on roller bearings
Skip operation	-	A pulse counter is mounted at the winch to provide skip positional information and ultimate limits are located at both ends of the track
Support structure	-	Rolled steel sections to give 4 metres discharge clearance beneath storage hoppers
Safety controls	-	Slack rope sensing beam under winch, second top ultimate cuts power to winch motor, over speed monitoring and brake wear alarm
Mixer guarding	-	Galvanised panel guarding around mixer discharge to skip car with hinged access gates and key interlock system for direct lorry loading
Skip track guarding	-	Galvanised access gate to hot storage top section to prevent access during operation with key interlock system
Winch guarding	-	Ground mounted skip winch unit enclosed in galvanised safety fence to prevent access whilst skip is in operation with key interlocked system

23.2 PNEUMATICS

Air receiver	-	Air receiver mounted on mixed material storage structure
Pneumatics	-	Solenoid valves, nylon pipe work and fittings

StarMix 4000 Asphalt Plant Motor List

Item	Quantity	Motor	Starter	kW	Total kW
1.	6	Feeder motors	Inverter	3	18
2.	2	Vibrators	DOL	0.3	0.6
3.	1	Collecting conveyor	DOL	7.5	7.5
4.	1	Dryer feed conveyor	DOL	11	11
5.	4	Dryer	Soft start	30	120
6.	1	Burner blower	Soft start	45	45
7.	1	Fuel pump	DOL	7.5	7.5
8.	1	Burner compressor	DOL	11	11
9.	1	Hot elevator	Soft start	30	30
10.	2	Screen	DOL	15	30
11.	2	Mixer	Soft start	45	90
12.	1	Compressor	DOL	15	15
13.	1	Coarse dust screw	DOL	7.5	7.5
14.	2	Cleaning mechanism	Inverter	0.75	1.5
15.	1	Filter screw	DOL	7.5	7.5
16.	1	Dust screw	DOL	7.5	7.5
17.	1	Rotary valve	DOL	1.1	1.1
18.	1	Exhaust fan	Inverter	160	160
19.	1	Dust elevator	DOL	5.5	5.5
20.	1	Imported dust screw	DOL	11	11
21.	1	Recl. dust screw	DOL	5.5	5.5
22.	1	Recl. dust screw	DOL	7.5	7.5
23.	1	Dust conditioner	DOL	15	15
24.	1	Water pump	DOL	1.5	1.5

25.	1	Recl. Dust screw	DOL	5.5	5.5
26.	1	Rotary valve	DOL	1.1	1.1
27.	1	Bitumen pump	Fwd/Rev	15	15
28.	1	Bitumen fill pump	DOL	15	15
29.	1	Skip winch	Inverter	90	90
30.	1	SMA Blower	DOL	15	15
31.	1	SMA screw conveyor	DOL	2.2	2.2

Total 760.50 kW

HEATING/OTHER SUPPLIES

32.	1	Bitumen weigh scale	1 ph + N	1	1
33.	2	Storage silo heating	3 ph + N	3	6
34.	3	Bitumen tank heating	3 ph + N	45	135
35.	3	Motorized stirrers	3 ph + N	5.5	16.5
36.	6	Trace heating	3 ph + N	3	18
37.	1	Winch supply	3 ph + N	1	1
38.	1	Cabin supply	1 ph + N	10	10

Total 187.50 kW