Twin Screw compounding line

Technical Details required by Customers

Manofal International GmbH

◆ **Commercial conditions**

Quantity	Designation
1	Extruder
	1 LEOG Water Cooling MOTOR, P=630KW for max. 600rpm screw speed, speed adjusted by INOVANCE inverter
	1 MECHANICAL SAFETY CLUTCH, from England Autogard or equivalent
	1SUPER HIGH TORQUE REDUCTION AND DISTRIBUTION GEARBOX, Zhitian products, model SHTD95-02,total torque 2x5570Nm
	1 PROCESSING SECTION L/D = 44 IN WEAR PROTECTION barrels with CR26 oval liners and wear protected screw elements
	1 COOLING WATER MANIFOLD
	1 WATER COOLING UNIT for cooling of barrels operated by means of demineralized water
	1 FRESH WATER OPERATED VACUUM UNIT, for degassing of polymer melt, fresh water operated, incl. catch pot
	1 SIEMENS IPC CONTROL CABINET, based on Siemens S-1500 PLC and high-level electrical configuration
1	Dumping station for a big bag package of HDPE pellet
1	Vacuum loader for HDPE pellet, model:ATB1500, capacity 2000kg/hr
1	Refill silo for HDPE pellet, volume 1000L, equipped with a down-level indicator and a compressed air-operated butterfly valve

1	Single Screw LIW feeder (3-point weight) for HDPE pellet, model: JW-LW-TP110, capacity 800～2000KG / Hr , accuracy ≤0.5%
1	Black MB Pellet negative pressure feeding bin 400L(25kg/per bag)
1	Vacuum loader for Black MB Pellet , model:ATB900, capacity 800kg/hr
1	Refill silo for Black MB Pellet, volume 500L, equipped Down level indicator and compressed air operated butterfly valve
1	Single Screw LIW feeder for Black MB Pellet, model: JW-LW-SS80, capacity 150kg/hr, accuracy ≤0.5%
0	Two stage steel platform, 1st stage for LIW feeders, 2nd stage for refill silos, Jwell design, customer prepared
1	Melt pump, volume 718CC, from MAAG Switzerland, model: EX 110-5 GP
1	Non-stop Hydraulic screen changer,Double cylinder with two positions, model: JC-SC-DC-200，From JC times
1	Underwater cutting system, JD-UWP-1500
1	Vibrator sieve, model JC-VS-2500, capacity 2500kg/hr
1	JC-FPC-2.5，5.5KW Final product conveying system, model JC-FPC-2.5, blower 5.5KW
1	Spare part and tools, Refer to spare part and tool list
1	Document, Refer to document list

Technical part

- **General**

▶ Products	HDPE Coloring	Based on multi-feeding process
▶ Output range:	1000kg/hr	@ 600rpm: depending on formulation, raw materials and operation conditions of extruder
▶ Formulation	Polymer type	95% HDPE pellet MFI:0.1~0.3 g/10min (190°C/5kg) 5% Black MB Pellet
	Powder type	
	Liquid type	
	Additive type	
	Others	
▶ Using conditions	Power：	380V/50Hz 3P+N+E
	Total power ：	860KW
	Cooling water	Temp ≤30℃,pressure 0.2-0.4Mpa,volume 30m3/h
	Compressed air	Pressure 0.6-0.8Mpa,volume2.0m3/h
	Installation site	Indoor (Temp 0℃—40℃, relative humidity ≤ 80%)

- **Machine specification**

◆ Technical parameters of the individual units

▶ Twin screw extruder

Screw Do	Φ93.5mm
Screw Di	Φ61.5mm
Screw channel depth	16mm
Do/Di	1.55
Barrel inner diameter	Φ94mm
Central distance	78mm
Screw and screw gap	0.5mm
Screw and barrel gap	0.25mm
Barrel L/D	L/D =44
Screw speed	Max 600rpm
Screw torque level	T/A3=11.0N.m/cm3
Main motor power	630kw
Heating power	125KW
Central height	1100mm

▶ HDPE Dumping station for big bag package of HDPE pellet

Big-bag clamping device	1 Set
Low level alarm lamp	1 Set
Electric hoist for big bag	1 Set
Bracket	1 Set
Control box	1 Set
Dosing device	1 Sets





▶ HDPEHDPE Pellet Vacuum loader

Model	ATB1500
Raw material state	HDPE Pellet
Bulk density	0.5-0.6 kg/L

Max. capacity	2000Kg/hr
Vacuum pump power	15KW（Double section pump）
Loading height	~5m
Loading pipe	Steel wire winding pipe

- **HDPE Pellet refill silo for LIW feeders**

Silo volume	1000L
Silo material	SS304
Silo thickness	2mm
Vibrating hammer	Not equipped
Down level indicator	Equipped
Silo outlet	DN150/DN200(or according to LIW)
Refill valve type	Compressed air operated butterfly valve

- **HDPE Single Screw LIW feeder (3-point weight)**

Model	JW-LW-TP110
Accuracy	-0.5%~+0.5%
LIW controller	Microchip
Screw type	Single screw
Motor power	2.2KW 380V AC
Motor control	Delta inverter
Agitator motor	No
Horizontal agitator	No
Applicable materials	HDPE
Capacity range	800～2000KG / Hr. 5 times range recommended
Feeder hopper	600L SS304

- **Manual damping station for 25KG bags- Black MB Pellet**

Silo volume	400L
Silo material	SS304
Silo thickness	1.5mm
Quantitative feeder	Equipped
Vibrating hammer	Equipped
Down level indicator	Equipped
Discharge outlet	ø40\50\60\76
Dust collector	equipped



- **Pellet Vacuum loader Black MB Pellet**

Model	Pellet
Raw material state	0.5-0.6 kg/L
Bulk density	800Kg/hr
Max. capacity	7.5KW（Double section pump）
Vacuum pump power	~5m
Loading height	Steel wire winding pipe
Loading pipe	Pellet

- **Black MB Pellet refill silo for LIW feeders**

Silo volume	500L
Silo material	SS304
Silo thickness	2mm
Vibrating hammer	Not equipped
Down level indicator	Equipped
Silo outlet	DN150/DN200(or according to LIW)
Refill valve type	Compressed air operated butterfly valve

- **Single Screw LIW feeder for Black MB Pellet**

Model	JW-LW- SS80LU（or)???
Accuracy	-0.5%~+0.5%
LIW controller	Microchip
Screw type	Single screw
Servo Motor	1.0KW 220V AC
Motor control	Servo drives
Agitator motor	No
Horizontal agitator	No

Applicable materials	**Black MB Pellet**
Capacity range	30-150kg / Hr. 10 times range recommended
Feeder hopper	120L SS304

- **Main motor**

Motor brand	LEOG (or any German substituents)
Motor type	Permanent magnet motor
Motor power	630KW AC
Motor drive	INOVANCE inverter
Motor speed	1480rpm
Efficiency standards	IE4
Motor protection level	IP55
Cooling	Water Cooling

- **Twin screw extruder gearbox**

Gearbox brand	Zhitian (or any German bran)
Gearbox model	SHTD95-02
Gearbox type	Super high torque
Output torque	2x5570Nm
Reducer ratio	i =2.5
Max. output speed	600rpm
Needle bearing brand	INA
Thrust bearing brand	Local made
Other bearings brand	NTN
Gear accuracy	Grade 6
Gear & Shaft material	17CrNiMo6&WR15E etc
Oil pump motor power	1.5KW
Heat exchanger area	4.1m^2
Lubricant oil volume	210L

Lubricant oil type	Medium load gear oil 220#

- **Screw elements of extruder**

Screw element material	W6Mo5Cr4V2
Screw element level	High wear-resistant
Wear resistant Grade	✱✱✱+
Corrosive resistant Grade	✱
Toughness Grade	✱✱
Heat treatment type	Vacuum quenching
Screw element hardness	HRC 58~60
Surface treatment	Standard



- **Shaft of extruder**

Shaft material	JA15E
Raw material source	Imported from Finland
Shaft strength type	Super high torque
Torque	⩽12N·m/cm³
Heat treatment type	Tempering
Hardness range	HB360~390
Connection type	Spline

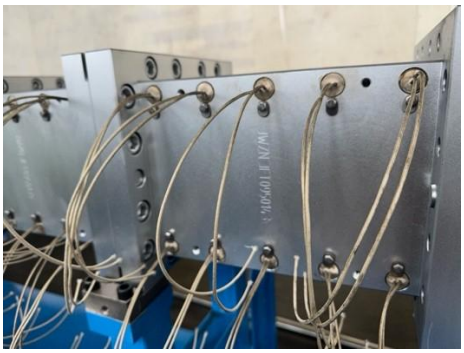


- **Barrels of extruder**

Barrel material	45# Steel + CR26 Oval liner
Barrel level	High wear resistant
Wear resistant Grade	✳✳✳✳
Corrosive resistant Grade	✳
Heat treatment for base material	Tempering after hammering
Barrel liner material	CR26 High chromium alloy
Liner shaping method	Vacuum casting
Heat treatment for liner	HIP consolidation
Barrel hardness	HRC 60~64
Barrel L/D	L/D= 4
Barrel heating type	Cartridge heater
Barrel cooling channel type	Standard design
Cooling channel diameter	Standard
Section structure sealing	None
Temperature sensor distance to barrel inner surface	≤5mm

- **Heater and thermal proof**

Heater type	Cartridge heater
Heater power density	7.0~9.0W/cm^2
Heater install type	Insert through holes
Heater connection	From single side
Heater cable	High temperature wire
Heater cable protection	Metal-sheathed
Heater cover material	SS304



- **Cooling water manifold**

Material of inlet & outlet pipe	SS316
Diameter of inlet & outlet pipe	Standard
Material of brand pipe	**Flexible rubber pipe**
Diameter of brand pipe	Standard
Material of connect & valve	SS316
Volume adjusting valve	Needle valve
Solenoid valve brand	VMI or CKD
Inlet water pressure display	Pressure meter
Bypass pipe	Equipped

- **Extruder base frame**

Base frame material	Q235

Raw material shape	Profile steel
Manufacture method	Welded
Strength Grade	12.0N·m/cm³
Machining method of installation surface	One time milling molding
Heat treatment	None
Damping mode	Disc support
Axial moving rail	Not equipped
Side direction moving rail	Not equipped
Moving wheels	Not equipped

- **Barrel water cooling unit**

Pump model	IZ65-50-125
Pump type	Centrifugal pump
Water pump motor	3KW
Water pump volume flow	25m³/hr @ 2bar
Water tank volume	600L
Water tank position	**2 meters high**
Water tank material	SS304
Heat exchanger area	15 ㎡
Cooling water capacity	16m³/hr
Cooling capacity	149KW
Filter	Y Type filter
Cooling medium	Demineralized water
Process water temp. range	50~65℃
Cooling water temp. range	10~30℃
Pipe to connect extruder	Flexible pipe

- **Vacuum degassing system**

Vacuum pump type	Water ring pump
Vacuum pump brand	Yulong
Model	SK-6D
Vacuum pump power	11KW
Suction volume	360m^3/h
Ultimate vacuum level	-0.095Mpa
Fresh water consumption	1.5m^3/h
Vacuum tank diameter	Φ450mm
Vacuum tank material	SS304



- **Melt pump**

Brand	From Switzerland MAAG
Raw material	HDPE
Max capacity range	1070~1524kg/hr
Model	EX 110-5 GP
Pump volume	718CC
Max pressure at outlet	35MPa
Max differential pressure	25MPa
Speed range	0～50r/min

Driving motor	37KW, INOVANCE inverter control
Heating method	Heat transfer oil
Mold temperature controller	Equipped





- **Non-stop Screen changer**

Brand	JC-Times
Screen changer type	Double cylinder with two positions
Model of screen changer	JC-SC-DC-200
Capacity range	900~2000kg/hr
Screen size	2*314cm2
Screen changer material	38CrMoAlA
Heating power	24KW
Heating zone	2
Melt pressure before screen	Equipped
Hydraulic oil pump	3KW
Accumulator volume	16L



- **Underwater cutting system**

Model	JD-UWP-2000
Product	HDPE Coloring
Capacity range	~1500kg/hr

◆ **Cutter**	
Motor power	7.5 KW 380VAC
Motor speed	500~3000 rpm/min
Driving mode	INOVANCE inverter
Motor protection class	IP54
Feed mode	Automatic compressed air feed
Cutting knife quantity	8 PCS
Blade model	1235
◆ **Die head**	
Die throat diameter	⌀2.8mm
Die material	High wear alloy, hardness：~HRC 91
Mode head heating mode	Electric heating tube heating
Heating power	7.5 KW
◆ **Drive Valve**	
Heating power	4 KW
Drive valve drive mode	Hydraulic pressure
◆ **Dewatering unit**	
Dryer	WS-2000
Motor brand	SIEMENS

Motor power	11 KW 380V
Motor speed	1480rpm
Motor protection class	IP54
Material	SS304
◆ **Circulating water system**	
Pump	Centrifugal stainless steel pump
Motor power	4 KW 380VAC
Motor speed	2880rpm
Water flow	35m3/h
Water cooling system	Plate type heat exchanger
Material quality	304
Heat exchange area	15 m^2
◆ **Water tank**	
Material	SS304
Tank volume	1.5 m3
Heating power	20 KW 380VAC
◆ **Hydraulic pressure system**	
Motor power	4 KW 380VAC
Maximum(stream)flow	12L/min
Maximum allowable pressure	16Mpa
Oil tank volume	25L
Hydraulic oil model	The Great Wall 46# wear hydraulic oil
◆ **Control system**	
PLC	Siemens S-1200
Touch screen	Siemens 12 inch highlight touch screen
Frequency converter	INOVANCE
Solid state relay	United States of America
Contactor	Schneider, France
Air breaker and button	Schneider, France

▶ **Vibrator sieve**

Vibrator model	JC-VS-2500
Capacity	2500kg/hr
Vibrating motor	2*0.4KW
Screen length	3.0m
Screen width	0.85m

Effective screening size	2.5m2
Big screen hole diameter	Φ6mm
Small screen hole diameter	Φ2mm
Body material	SS304
Steel thickness	3mm
Cooling blower	Equipped
Cooling fan	Not equipped
Inlet height to ground	1.05m

- **Final product conveying system**

Product model	JC-FPC-2.5
Final product volume	2.5m³
Blower power	11KW
Pipe diameter	DN130
Body material	SS304
Material thickness	2mm
Connection type	Quick open
Discharge Valve	Equipped
	

- **Siemens IPC control system**

Electric control system configuration level	High level electric configuration

IP level	IP55
Safety level	2 or above
EMC/RFI level	C3
Electrical cabinet brand	Rittal
Busbar system	WOHNER
Control method	Siemens IPC control system
PLC brand	Siemens S-1500
Touch screen	Siemens 15 inch highlight touch screen
Touch screen position	On separate moving frame
Main motor inverter	INOVANCE
Temperature control type	Silicon control
Contactor & breaker	Siemens
Main breaker	Siemens
Small breakers	Siemens
Silicon control brand	Taiwan Yangming
fuse	Wohner or Bussmann
Button, signal light & middle relay	Schneider
Connector	Phoenix
Temp sensor	PT-100
Temperature range	0-400℃
Pressure sensor and pressure meter	GEFRAN
Industrial computer	Siemens
Monitor	Phillips or Samsung
Cable connection type	From bottom
Remote control	Equipped
Cooling method for cabinet	Air conditioner cooling
	The operation side of one of them should be on right the other on left

Standard Interlock requirement as following:

（The real interlock system according to scope of supply ）

Twin screw extruder interlock with gearbox lubrication oil pump, only after oil pump start, the extruder can be started;

The extruder will interlock to stop after oil pump stop;

Main motor interlock with motor cooling fan, only after cooling fan start, the main motor can be started;

The extruder will interlock to stop after cooling fan stop;

Feeders or LIW feeders or side feeders interlock with extruders, only after extruders start, the feeders or LIW feeders or side feeders can be started;

If extruders stop, feeders or LIW feeders or side feeders interlock to stop;

Side feeders interlock with feeders or LIW feeders, only after side feeders start, the feeders or LIW feeders can be started;

If side feeders stop, feeders or LIW feeders will interlock to stop;

Main motor interlock with die head pressure, main motor will alarm or stop after over-pressure;

Main motor interlock with main motor current, main motor will alarm or stop after over-current;

The main motor will interlock to alarm or stop with parts auxiliary motor when over-current or motor blockage or lack of power phase.

▶ **（Optional Spare part）**

SN	Item
1.	Electrical valves 6 pcs
2.	Oil filters 10 pcs
3.	Granulator knifes 10 pcs
4.	Die head 2 pcs

▶ **Spare part and tools**

Name	数量 Quantity
Screw element	500 mm
Oil sealing for gearbox	3 Set
O rings	10 Pcs
PT-100	3 Pcs
Solenoid valve	5 Pcs
Fuse	10 Pcs
Protection Gloves	1 Pair
Inner hexagon spanner	1 Set
Outer hexagon spanner	1 Set
+/- head screw driver	2 Pcs
Copper bar(Φ30*30)	1Pcs
Screw ring	2 Pcs