"APPROVED» by
Chairman of the Expert and
Technical Commission
Chief Mechanic of the SGCC
_____ H. Allayarov
"___" _____2021.

TECHNICAL SPECIFICATION for

the supply of a line for the production of pressure pipes made of polyethylene for water supply with a diameter of 50 mm to 250 mm.

Shurtan GCC – 2021г.

Content

1. General information

1.1. This Technical Specification (TS) is developed in order to receive proposals from potential suppliers of lines for the production of pressure polyethylene pipes for gas and water supply of different diameters and types, by extrusion in accordance with the requirements. When working out technical and commercial proposals, additional requirements and conditions may be presented to potential suppliers, aimed at detailing and unifying the submitted proposals.

1.2. The purchase of a line for the production of polyethylene pipes is carried out on the basis of the order of the General Director of LLC "Shurtan Gas Processing Plant" for No. 072/7889 dated 04.05.2021.

1.3. Place of operation-Karshitermoplast workshop, Karshi

1.4. Working hours of the enterprise: Two shifts of 12 hours a day, not less than 8000h/year.

1.5. The equipment is intended for industrial production of pipes for gas and water supply from polyethylene using soot concentrate.

2. Technical specification of raw materials and consumables

2.1 The main raw material used is polyethylene grade P-Y337, P-Y342, P-Y456 produced by the Shurtan GHK and polyethylene grade M-8000 produced by the Ustyurt GHK (Appendix).

2.2 Corresponding grades of soot concentrate will be used as additional raw material. Soot concentrate - masterbatch with soot content in polyethylene in the range of 30-40%.

3. Technical specification and requirements for the finished product.

3.1. Technical characteristics of polyethylene pipes according to GOST 18599-2011.

Average outer diametr		*SDR 41* S20		*SDR 26* S12,5		*SDR* 17,6 S 8,3		*SDR 11 S5*		Ovality after extrusion, no more than
		Maximum working water pressure at 20 0 S, MPa								
		0,25		0,4		0,6		1		
		Wall thickness								
nomin.	lim.	nomin.	lim.	nomin.	lim.	nomin.	lim	nomin.	lim.	
50	+0,5	—	—	2,0	+0,4	2,9	+0,5	4,6	+0,7	1,4
63	+0,6	2,0*	+0,4	2.5	+0.5	3,6	+0,6	5,8	+0,9	1,5

75	+0,7	2,0-	+0,4	2,9	+0,5	4,3	+0,7	6,8	+1.1	1.6
90	+0,9	2,2	+0,5	3,5	+0,6	5.1	+0,8	8,2	+1,3	1.8
110	+1,0	2.7	+0,5	4,2	+0,7	6,3	+1,0	10,0	+1.5	2,2
160	+1.5	4,0	+0,6	6,2	+1,0	9.1	+1.4	14,6	+2,2	3,2
200	+1,8	4,9	+0,8	7,7	+1.2	11,4	+1.8	18,2	+2.8	4.0
250	+2,3	6,2	+1,0	9,6	+1.5	14.2	+2,2	22.7	+3,5	5.0

* The minimum pipe wall thickness is rounded to the nearest values of 2.0 and 3.0 mm.

Note-It is allowed to produce pipes with the maximum deviations specified in parentheses.

3.2. The content of soot in the finished product is from 2 to 2.5%;

4. Scope of delivery of equipment and services

4.1. The equipment must be new. It must be previously unused and previously not exploited.

4.2. All components, assemblies, parts and components of the technological line must be manufactured no earlier than in 2021.

4.3. Preliminary list of units and parts of the technological line: The given list of units and parts is preliminary. The actual completeness of the line is determined by the manufacturer based on the requirements of the final products being converted.

4.3.1. Vacuum loader of raw materials;

4.3.2. Raw material mixer;

4.3.3. Gravimetric dispenser;

4.3.4. The extruder;

4.3.5. Forming head with replaceable nozzles and calibrations for the specified types of SDR;

4.3.6. Accompanying strip extruder;

4.3.7. Hydraulic type nets;

4.3.8. Vacuum calibration bath;

4.3.9. Cooling bath;

4.1.10. Pipe wall thickness meter

4.1.11. Main control panel with PLC control with touch screen;

4.1.12. Laser printer for marking pipes;

4.1.13. Pulling device;

4.1.14. Pipe cutting device;

4.1.15. Receiving device;

4.1.16. Winding device;

4.1.17. Tipper;

4.3.18. Portable (mobile) accumulator strapping machines for strapping rolls of polyethylene pipes in the amount of 2 pcs. They are equipped with a battery and a charger.

4.3.19. Plastic waste crusher;

4.3.20. Required quick-wear spare parts, oils and lubricants for 2-year operation;

4.3.21. A set of tools for re-fitting the line to another type of pipe (a set of keys, devices for cleaning the forming heads from hot polymer, etc.);

4.3.22. Devices for measuring the parameters of manufactured products, such as wall thickness, diameter, length of pipes, etc.

4.3.23. Based on the generally accepted engineering practice, potential suppliers can offer the necessary additional and auxiliary equipment.

4.4. Technical specification of the equipment

4.4.1. Standard power supply-220/380V with a frequency of 50 Hz;

4.4.2. Guaranteed capacity of **at least 500 kg/hour** of pipe products, taking into account the reserve load on the engine;

4.4.3. The guaranteed service life of the line is not less than 3 years or 24,000 hours in a stable mode.

4.4.4. Control – automatic local control of the main parameters (zone temperature, melt pressure, raw material consumption, bath water level, screw speed, etc.);

4.4.5. Control of the drives using equipment from well-known manufacturers;

4.4.6. Availability of protection (blocking) and alarm systems;

4.4.7. Provide for the possibility of further maintenance and monitoring of the software of the automatic control system of the technological process and visualization using a programmer or a special computer (open architecture principle);

4.4.8. Instrumentation and control systems for monitoring and controlling all elements of complete lines must be from well-known advanced manufacturers using modern technology;

4.4.9. Equipment requirements:

4.4.9.1 Auger -

o The auger (screw) must be made of 38CrMoAl material or similar, not inferior in quality, materials (high-temperature resistant steel, heat-treated, with a nitrided coating);

o Treatment of the working surface of the extruder screw for hardening-nitriding to a depth of 0.4-0.7 mm;

4.4.9.2. Cylinder –

o The cylinder must be made of 38CrMoAl material or similar, not inferior in quality, materials (high-temperature-resistant steel, heat-treated, with a nitrided surface);

4.4.9.3. Gears–

o The toothed kernels must be made of a high strength alloy steel alloy;

4.4.9.4. Gearbox–

o The material of the gearbox components is an alloy of high-quality steel (GC20 or similar grades), with a surface treatment with high-frequency currents;

o When designing the gearbox, the supplier must take into account the axial and radial loads;

4.4.9.5. All electric motors of the line must be equipped with frequency converters and must be manufactured by well-known manufacturers with increased efficiency, meet the standards and specifications of IEC, DIN, ISO, VDE, EN, API.

4.4.9.6. The heating and cooling of all areas of the extruder must be controlled by contactless relays, which must be supplied with the necessary two-year supply.

4.4.9.7. The line must be equipped with a voltage stabilizer to protect against voltage drops in the network.

4.4.9.8. Component feed unit –

o Pneumo/vacuum loading of PE pellets, soot concentrate and crushed waste;

o The presence of a mixer of PE pellets, soot concentrate and waste for uniform mixing;

4.4.9.9. Requirements for the pre-extrusion part:

o Mesh replacement device (continuous production);

o Tools for replacing the heads when changing the pipe type to another one

4.4.9.10. Requirements for post-extrusion equipment:

o Use of a specific design of the head to prevent inhomogeneity of the layer in the cross-section of the pipes;

o Optimal calibration and cooling to avoid uneven areas;

o The possibility of accurate and uninterrupted control, performance, ovality, diameter and thickness with an error in accordance with the standards for the finished product;

o Ensuring the cutting of pipes preventing the deformation of the end part of the pipe segment;

o Ensure the winding of pipes with a diameter of 50mm, 63mm, 75mm and 90mm in rolls up to 200 meters;

o Providing cutting of 110mm, 160mm, 200mm, 250mm, and laying of pipes up to 12 m.;

o The extrusion equipment for the production of products must ensure the uniformity of mixing of polyethylene with soot concentrate.

4.4.9.11. Requirements for marking line equipment:

The presence of markings on each equipment of the extruder line. The main marking data should contain:

o the name of the type of equipment (conditional name) and (or) the designation of the type of equipment;

o nominal values of the most important parameters of the equipment: voltage, current, frequency, power, etc.;

o date of manufacture;

o the trademark or name of the manufacturer.

4.5. Services provided by the equipment supplier

4.5.1. The scope of the supplier's services under the concluded contract for the supply of complete equipment includes:

4.5.1.1. Delivery of all components and parts of production lines on DAP terms (according to INCOTERMS 2010) up to st. Kengsoy, State joint stock railway company "Uzbekistan Airways", station code 732602.

4.5.1.2. Supervision of installation and commissioning at the Customer's site of equipment, supplied main and auxiliary equipment;

4.5.1.3. All expenses for accommodation, meals, daily expenses, air tickets, travel expenses and other expenses of the supplier's specialists;

4.5.1.4. On-site training of the customer's personnel;

4.5.1.5. Commissioning of the installed equipment;

4.5.1.6. Coordination of work by the supplier and sub-suppliers on equipment configuration;

4.5.1.7. Conducting comprehensive performance warranty tests at the Customer's site after putting the complete equipment into operation and putting it into stable operation in order to confirm:

o Equipment operability;

o The guaranteed capacity of the equipment on the selected product sizes in accordance with the specified paragraph 4.4.2.;

o Guaranteed quality of manufactured products in accordance with GOST 18599-2011;

4.5.1.8. Provision of qualified personnel to the manufacturer during commissioning and complex performance tests;

4.5.1.9. Technical support (guaranteed support with spare parts) for 3 years of further operation.

4.5.1.10. Warranty for the equipment, indicating the hours or days of operation after the completion of the comprehensive operational test for guaranteed performance and the signing of the certificate of acceptance of the equipment;

4.5.2. During the warranty period, the supplier is obliged to send qualified specialists to eliminate any equipment problems that occurred due to the improper quality of the supplied equipment, or hidden equipment defects that could not be detected during the warranty performance tests;

4.5.3. The period between the receipt of the notification of the warranty event and the arrival of the supplier's specialists at the customer's site should not exceed 21 calendar days;

4.5.4. If it is necessary to replace any defective unit or part of the equipment, the period of replacement of the part and elimination of the identified defect should not exceed a period of more than 1 (one) month, unless otherwise stipulated by the production cycle of the replaced part and / or unit;

4.6. Requirements for the technological documentation supplied with the equipment

4.6.1. The set of documentation supplied with the equipment must consist, but not be limited to, the following list of documentation provided in Russian and English, 2 copies, in paper and electronic versions for each type and unit of equipment:

4.6.1.1. Instructions for installation, assembly and adjustment of equipment;

4.6.1.2. Detailed drawings of the general view and sketch diagrams of the main and auxiliary equipment, indicating the specific properties and detailed energy requirements;

4.6.1.3. Brands and detailed drawings of individual components and parts (bearings, oil seals, etc.) and a detailed drawing of the main gearbox in the section with a list of parts and parts by position;

4.6.1.4. Drawing and detailed description of the parts used, bolt dimensions;

4.6.1.5. Repair, operation and maintenance manual;

4.6.1.6. Electrical connection diagrams (all types), loop diagrams (LoopDiagram) for instrumentation and control systems;

4.6.1.7. Instrumentation and equipment of TRC and A (Automated Process Control System (APCS), Accident prevention (AP), etc.) with passports and certificates of conformity;

4.6.1.8. Description of blockages (block diagrams) indicating the reasons for possible emergency stops (causal diagram) and their effect on the devices;

4.6.1.9. Printing of logic programs of the Software-logic controller (PLC);

4.6.1.10. Technical characteristics and description of devices and other technical information;

4.6.1.11. Detailed technical specifications of spare parts of the entire line with a description and indication of drawings;

4.6.1.12. Productivity in linear meters per hour for each diameter and type (SDR) of pipes, taking into account the raw materials used;

4.6.1.13. Production plan for each standard size with a uniform breakdown in ppm / min and kg / h;

4.7. Requirements for the packaging of the supplied equipment

4.7.1. The equipment must be shipped in export packaging that corresponds to the nature of the supplied equipment. The packaging must protect the cargo from all kinds of damage and corrosion; the materials used for the packaging must be of good quality, of sufficient strength, excluding the possibility of damage during loading, reloading and unloading. At the same time, the packaging must also be adapted to handling by cranes and loaders.

4.7.2. The supplier is fully responsible for any damage to the equipment due to poor-quality packaging.

4.7.3. Equipment insurance is carried out at the expense of the supplier.

5. General requirements for testing equipment for warranty performance

5.1. The equipment after installation, commissioning and commissioning will be subjected to comprehensive operational tests for guaranteed performance in order to confirm:

5.1.1. The operability of the equipment;

5.1.2. Guaranteed power of the equipment for 72 hours of continuous operation with the following parameters:

- capacity of at least 500 kg / hour
- pipe diameter-250mm;
- SDR– 11.

5.1.3. The quality of the products produced during the warranty tests must comply with the quality indicators set out in paragraph 3 of this Technical Specification.

5.1.4. Operational tests of the technological line for guaranteed performance are carried out no more than 3 (three) times during 72 hours of continuous operation.

5.1.5. The damage caused is covered by the manufacturer in the following cases:

- if the capacity of the pipe production line is lower than specified in the company's offer;
- the complete set of the line will differ from the one specified in the offer;
- the line will not pass the warranty test and will not be delivered to the customer within the specified period.

6. Requirements for the technical part of technical and commercial proposals of potential suppliers

6.1. The technical part of the technical and commercial proposals of potential suppliers should at least consist of the following documents:

6.1.1. The submitted technical proposal must be written in the state or Russian language and duplicated in English
6.1.2. The submitted technical proposal must have a copy on electronic media (CD / DVD discs or USB storage media);
6.1.3. It is necessary to provide certificates (international certificates ISO-9001, 14001,50001, 45001, certificate of origin, manufacturer's quality certificate and/or other certificates of international, recognized laboratories and testing centers);
6.1.4. It is necessary to provide a list of companies that are users of the proposed product;
6.1.5. It is necessary to specify publicly available information about the manufacturer (the company's website);
6.1.6. Reference list for the supply of similar equipment for the last 3 years, indicating the contact details of the Customers.
6.1.7. Technical characteristics of the main and auxiliary equipment, indicating the guaranteed capacity of the equipment of the products produced, the service life of the equipment, specific properties and detailed energy requirements;
6.1.8. Basic equipment and all possible options;
6.1.9. Information on the materials used for the manufacture of the main and auxiliary extruders body and screw with the application of the certificate of conformity;
6.1.10. Detailed drawings of the general view of the main and auxiliary equipment;

• Scope of delivery-1 set
* Delivery time - from 90 days.
• Source of financing: Own funds of LLC " Shurtan GCC"

Terms of delivery

Carriage delivery:	*DAP-railway station Kengsoy (station code – 732602), State Joint Stock Railway Company SJCRC "Uzbekiston Temir Yollari"*
Transport delivery:	*DAP-Republic of Uzbekistan, Kashkadarya region, Guzar district, Shurtan village, 180300*
Container delivery	*DAP-railway station Kengsoy (station code – 732602), State Joint Stock Railway Company SJCRC "Uzbekiston Temir Yollari"*

**** Note: The developer is responsible for the correctness of the filling and the blank items.***

Developers:

Deputy Chief Mechanic: _____ **M. Salaev**

Head of material and technical resources accounting system _____ **T. Vasiev**

Head of the workshop "Karshi Thermoplast": _____ **A. Shomurodov**

Technical Engineer _____ **Z. Shermatov**

Workshop technologist: _____ **Z. Khuzhanov**

UNG Shurtan GKM

Приложение №1 / AppendixNo1

Technical specification of UZCLEAR Polyethylene

Технические характеристики марок ПЭ

№	PE Grade & Type Марка и Вид ПЭ		Density, g/cm³ Range/ Диапазон	MFI, g/10min Range/ Диапазон	Kind of processing Вид переработки	Recommended enduse Рекомендуемая область применения
PIPE GRADES / ТРУБНЫЕ МАРКИ						
1.	P-Y337	MDPE	0,936 – 0,940	0,21 – 0,33	Extrusion Экструзия	Base resin- gas pipe базовая марка для газопроводных труб
2.	P-Y242	HDPE	0,940 – 0,944	0,24 – 0,33		Base resin- pressure pipe, Трубные изделия, базовая марка для напорных трубопроводов
3.	P-Y342	HDPE	0,940 – 0,944	0,3 – 0,36		
4.	P-Y456	HDPE	0,952 – 0,958	0,31 – 0,51		large diameter pipe drainage profile трубы большого диаметра (дренаж)

Recommended enduse Рекомендуемая область применения			PIPES ТРУБЫ		
Property / Свойства	Test method Метод испытания	Unit Единица	P-Y337	P-Y342	P-Y456
Density / Плотность	ASTM D792	g/cm3	0,939	0,941	0,956
MFI / ПТР (190@2.16)	ASTM D1238	g/10 min	0,27	0,28	0,41
Tensile strength at yield Прочность при растяж.	ASTM D638 / (D882-Film)	MPa	16	21	30
Tensile strength at break Прочность при разрыве	ASTM D638 / (D882-Film)	MPa	30	21	31
Elongation at break Относитель удлинение	ASTM D638 / (D882-Film)	%	600	750	860 / 50
Ударная прочность IZOD impact strength	ASTM D256	J/m	нет	нет	нет
Твердость по Шору Shore hardness	ASTM D2240	Shore D	62	62	67
Точка смягчения Vicat softening point	ASTM D1525	^{0}C	121	122	125
ESCR	ASTM D1693/B	hour	1000	1000	100
Flexural modulus Модуль упругости	ASTM D790	MPa	565	590	1210
Распределения молю веса Molecular weight distrib.			Широкий Wide	Широкий Wide	Широкий Wide

Uz-Kor Gas Chemical

M8000 High Density Polyethylene

Description
ISO PE-100 Class, Good ESCR

Application
Water supply pipe and Gas pipe

Properties			
Physical	**Testing methods**	**Nominal values**	
Density	ASTM D 1505	g/cm^3	0.948-0.951
Melt Flow Rate	ASTM D 1238	g/10min	4.5-6.0 (H.L.)
Mechanical			
Tensile Strength at Yield (min.)	ASTM D 638	kg/cm^2	190
Elongation at Break (min.)	ASTM D 638	%	500
Flexural Modulus (min.)	ASTM D790	kg/cm^2	8,000
Impact			
Izod Impact Strength (23 ^{0}C) (min.)	ASTM D256	kg cm/cm	NB
Thermal			
Vicat Softening Point (min.)	ASTM D1525	^{0}C	120
Additional properties			
Rockwell Hardness (min.)	ASTM D785	R	43
Environmental Stress Cracking Resistance (F50) (min.)	ASTM D1693	hr	>1000

H.L. – MI value at high load (21.6 kg)
NB – Do not break