



جمهوری اسلامی افغانستان
شماره ۱۱۱۱



مشخصات فنی

پروژه تدارک ماشین، تجهیزات و مواد خط اندازی جاده

Technical Specification
Road Marking Machine, Equipment, and Material

Section I

Material Specifications

1- Thermoplastic Road Marking Paint

Thermoplastic road marking paint also called hot melt marking paint, is a kind of powder paint. When applied as road surface markings, a hot melt kettle is used to heat it to 200 °C, after which it is sprayed on the road surface. The coating then becomes a line after cooling. This paint is thick coating, wear-resisting, bright and reflective. Thermoplastic can be used very effectively for large Anti-skid areas on roads and pedestrian walkways by adding glass beads. It can be produced in any color and is great for car parks, factory walkways and many other areas. It's fast drying and can be driven over after just a few minutes.

Thermoplastic Road Marking includes Paint, with hot mix or drop on glass beads which create reflectivity.

The contractor should provide test reports of thermoplastic paint, glass bead from manufacturer company. Update test report of material should be submitted along with material.

Followings are technical specification for paint and glass bead:

1.1. Composition

Below are based on AASHTO M249:

Description	Unit	White	Yellow
Binder (Resin + Oil)	%	≥18	19.4
Glass Beads Contents	%	30 – 40	30 – 40
Titanium Dioxide	%	≥10	-
Resin Type	-	Hydrocarbon	Hydrocarbon
Calcium Carbonate and inert fillers	%	≤42	-
Yellow Pigment			

- ⇒ Pigment material should be Titanium Dioxide
- ⇒ Sufficiently heat stable LEAD CHROMATE should be the yellow pigment used. Its content has to be such that to give a minimum of daylight reflectance of 45%.
- ⇒ Filler (Calcium Carbonate) should be made of Natural Chalk

1.2. Physical Characteristic:

Properties	White	Yellow
Specific gravity	≤ 2.15	≤2.15
Daylight reflectance at 45°/0°	≥ 75	≥ 45
Bond strength (MPa)	≥ 1.24	≥ 1.24
Cracking resistance	No cracks	No cracks
Impact resistance (J)	≥ 1.13	≥ 1.13
Luminance	>80	>80
Surface Drying time	≤4 min	≤4 min
Full Drying Time	≤10 min	≤10 min
Softening point (C°)	102.5±9.5	102.5±9.5
Flowability	≤ 18	≤ 21
Yellowness resistance	≤ 0.12	--
Flowability - Extended heating	≤ 28	≤ 28

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1.3. Reflectorization:

A: The (Pre-mix) Solid glass beads incorporated in the material, comply to type I category of AASHTO M 247 with the following properties:

Sieve Designation	Mass Percent Passing
Standard mm	Type I
0.600	75-90
0.452	--
0.300	15-35
0.150	0-5

Minimum spherical beads by mass should be 75%

B: Solid glass beads for additional surface reflectorization (Drop-on), comply to type II category of AASHTO M 247 with the following properties:

Sieve Designation	Mass Percent Passing
Standard mm	Type I
0.600	100
0.452	90 - 100
0.300	50 - 75
0.180	0-5

Minimum spherical beads by mass should be 75%

1.4. PACKING

The material is supplied in powder/granule form packed in approximately 25kg plastic sacks on pallets of approximately 1,000 kg.

2- Primer Material for Thermoplastic

Primer is primarily used to improve cohesion between road surface and thermoplastic paint. It uses on old asphalt surfaces, and concrete surface to create bonding between material and marking. Material should be consistent to thermoplastic paint, with following specifications:

- Usage: Road Marking Paint
- Application Method: Spray
- Material: Acrylic
- State: Liquid Coating
- Composition: Organic Material
- Application: Road Marking Thermoplastic Paint
- Color: Colorless

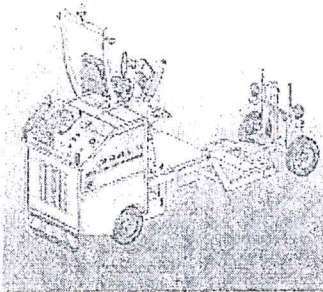





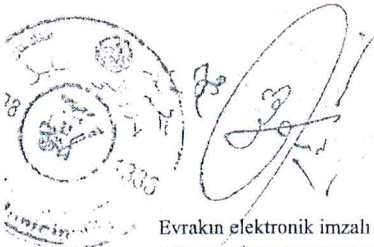
3- Self-Propelled Spray Application Thermoplastic Machine







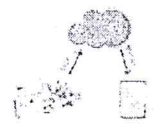
The supplied machine should have one-seat slidable drive and operator section for flexible working on the left or right side. The spray plastic equipment on the machine should be able to apply lines of up to 40 cm width, depending on the set-up. The equipment should be used for the application of plain lines, single and double lines of different widths, as well as for simultaneous application of continuous and interrupted lines. The thermoplastic spray application equipment works via a pressure tank. The amount of material that is put on the road is set by the pressure of the tank and the air pressure of spraying.

A Test Certificate together with a Certificate of conformity of EU should be submitted while providing self-propelled thermoplastic road marking machine.

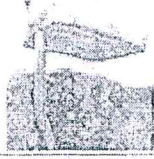


Part A: Road Marking Machine Specifications:

ROAD MARKING MACHINE FOR SPRAY-PLASTIC APPLICATION. PRESSURIZED MATERIAL TANK Technical Specifications and Equipment's.				
No.	Description	Quantity	Price	Image
1	<p>Road Marking Machine and it is basic equipment</p> <p>Machine with Below Specifications</p> <ul style="list-style-type: none"> * Water-cooled turbo diesel engine, 4 cyl. 2400 cm3, 44 kW/59 hp @2700 rpm * Screw compressor, 1800 liters/min. * Pneumatic control panel. * Hydraulic pump. * Electric system 12 V. * Hydrostatic, variable transmission 0-16 km/h. * Hydraulic piston pump, 40 cm3/cm3. * Hydraulic oil tank, 50 liters. * Hydraulic piston motors with integrated electronic hydraulic disc brakes. * Diesel oil tank, 50 liters. * Pressurized glass bead tank, 115 liters. /170 kg. * Diesel oil level gauge, water temperature gauge, hour meter. * Working lights. * Drive and operator section with 1 seat, slidable left to right. * Tool box and fire extinguisher. * Pulse transmitter for control unit 	1.0		
	Reversing Alarm	1.0		
	Pointer turning with steering	1.0		
	Hydraulic lifting system for pointer	1.0		




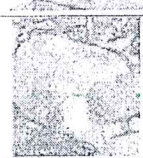



	THERMOPLASTIC MATERIAL TANK: Spray-plastic tank 290 Litre, Incl. agitator, diesel oil burner and heat transfer oil pump	1.0		
Spray plastic system	Heat transfer oil pipe kit	1.0		
	Retainer for spray plastic guns: Incl. 2 pc of spray-plastic guns complete with standard nozzles. Incl. lifting system.	1.0		
	Automatic glass bead gun, incl. holder & Ø12 valve seat	2.0		
	Hose kit for bead guns	1.0		
	Manufacturer @ LineMaster: Control unit for line marking, with GPS included Efficient control and easy adjustment of all road marking tasks, from line application and Premarking to reporting and invoicing. * Storage of 99 different line types - arranged in up to 30 marking programs *usb connection for exchange of data * 8" display, clear and easy reading of data * Choice of language	1.0		
LINE CONTROL SYSTEM	Manufacturer Online@ -data in the cloud: It is an online platform that allows user to easily get an overview of the Marking machine activity. Also, it must be free of charge for the first 6 months. Diagnostic data from the Machine is stored on the Manufacturer's Online platform, so user can always access this data and generate reports by accessing user Manufacturer Company Online account. All data should be stored for minimum 5 years. User should also be able to	1.0		



	receive a notice by SMS or e-mail 20 hours before the next service, or if motor, compressor or hydraulic oil is overheating. The manufacturer company should also have access to diagnostic data, which allows user to better understand the need services			
	Sunshade with 1 rotating warning light	1.0		
	Parts for the first service	1.0		
	Manual in English and Afghanistan National Languages	1.0		

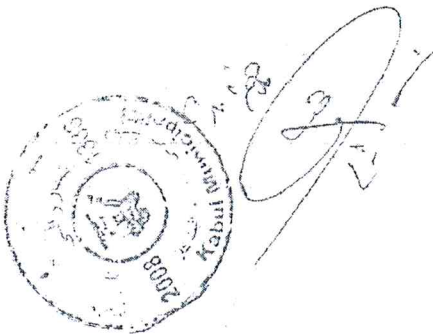
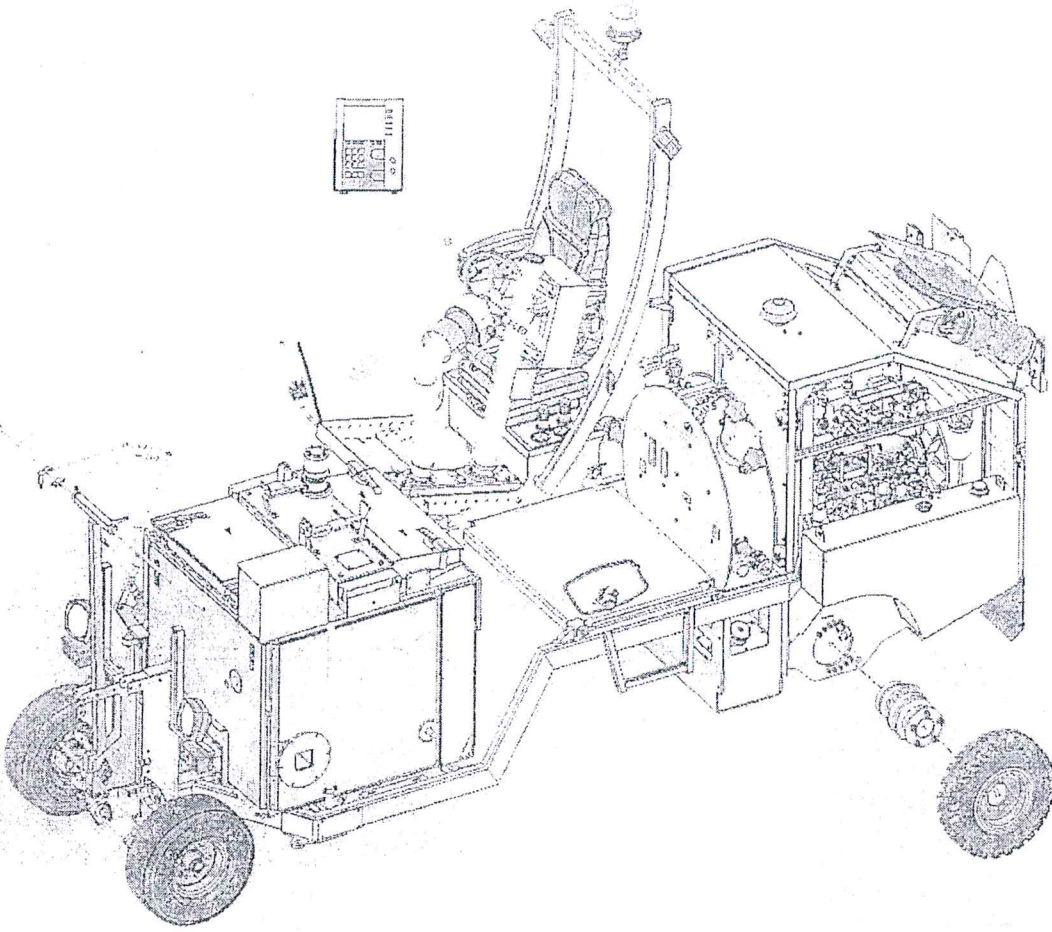
Part B: Following extra equipment should be mounted on the Self-Propelled thermoplastic road marking Machine:

No.	Description	Quantity	Price	Image
1	Bead Alarm: Sensor mounted on bead gun, detecting stop of bead flow and giving alarm	1.0		
2	Air drier for bead tank	1.0		
3	Premarking system with paint can	1.0		
4	Hydraulic broom: Sweeping width 400 mm	1.0		
5	Airknife for removing dust on the road	1.0		



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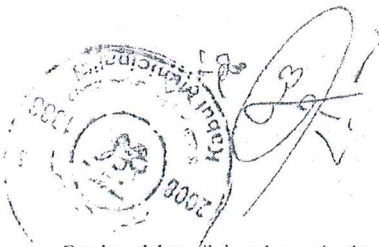
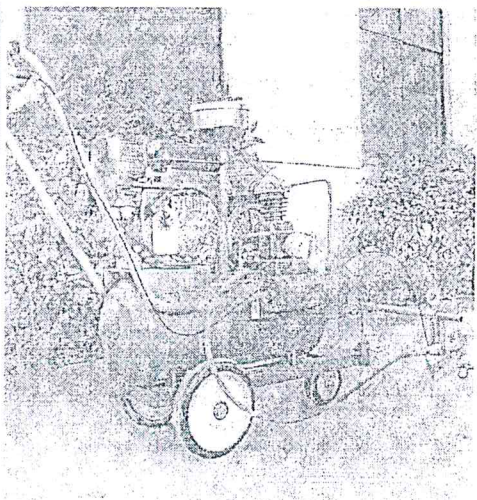
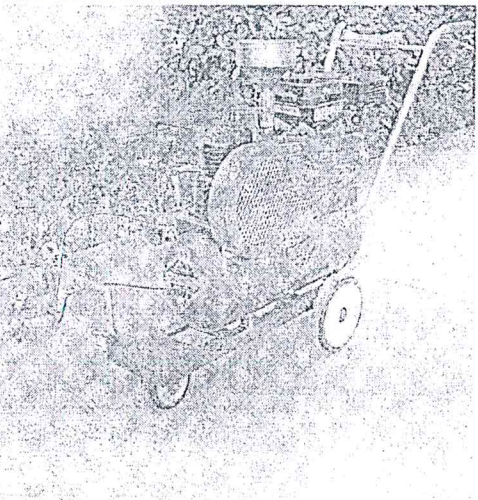
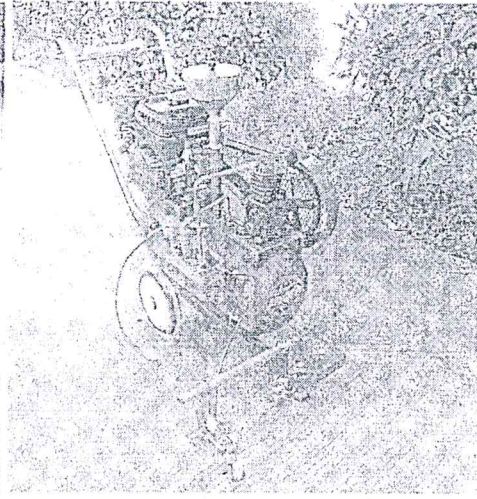
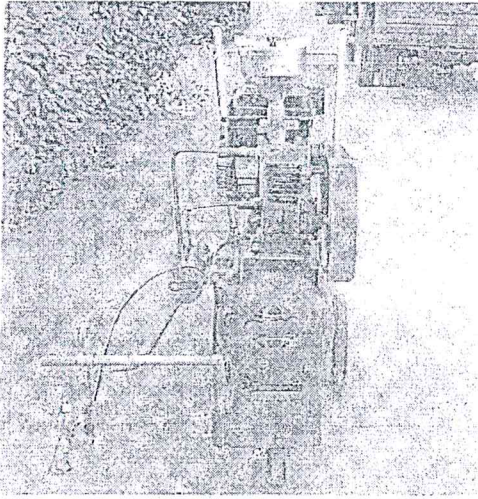
6	Safety package: gauntlets, forehead protection with face shield, 5 reflector vests, hard hat	1.0		
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4- Primer Sprayer Machine

Primer sprayer machine is used for spraying primer to improve cohesion between road marking paint and road surface. It can obviously prevent the peeling off of marking lines. Concrete road and old asphalt surfaces must be primed beforehand in the operating site with a primer

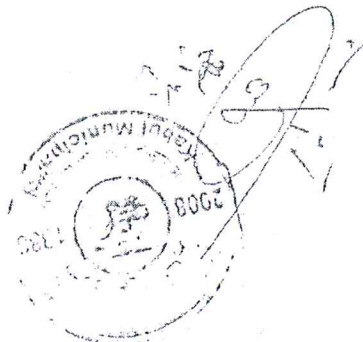
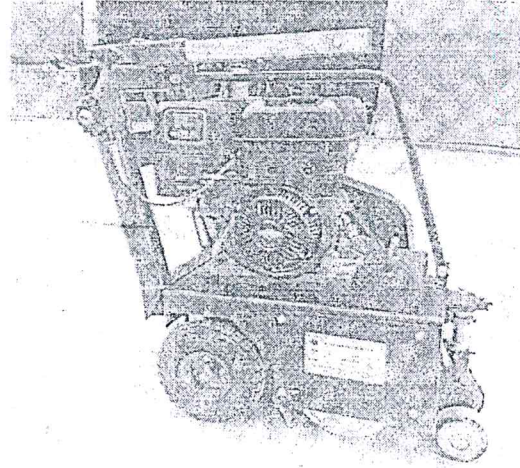
No.	Description	
1	Dimension	1400*620*940 mm
2	Weight	75 kg
3	Engine	5.5 HP
4	Engine Type	Honda Petrol (or equivalent)
5	Air Compressor	0.3m ³ /min
6	Pressure	0.8 mpa
7	Spraying Width	100-450 mm
8	Primer tank Capacity	50 kg



5- Road Marking Line Removal Machine

Road marking line remover is used for removing the waste or broken marking lines before marking new ones. It scrapes off marking lines through the spinning cutting head at the bottom of the machine. The cutting head is replaceable. The machine should be able to remove the marking lines thoroughly with minimize damage to the road surface. Also, machine should have ability of removing thermoplastic and cold paint clearly in short time. The supplied machine should have following specifications:

No.	Description	
1	Size (LxWxH)	1180*530*950 mm
2	Weight	255 kg
3	Engine Rated Power	13 HP
4	Removing Speed	3600r/min
5	Removal Cutter lifetime	200 hours, 8000-10000 m ²
6	Rotation Speed	3600r/min
7	Working Width	100-300 mm
8	Removing Depth	0-3 mm
9	Driving method	Self-propelled
10	Fuel Consumption	230g/h
11	Shaft number of drum	1 piece per drum
12	Drum number	6
13	Size of drum	128*83 mm
14	Size of per cutter	83*8 mm
15	Number of cutter	78 pieces



Section II

Training for Self-Propelled Spray Application - Thermoplastic Machine

Training on maintenance and application of Self-Propelled Spray Application Thermoplastic Machine should be provided by contractor for Kabul Municipality staff. The session should provide theoretical and practical information regarding the machine, and should be held in Kabul for at least 5 days.

The training should cover at least the following sessions:

- Application types / Materials / Equipment and functioning.
- Line control / Computer functioning / Simulator training.
- Technical issues and maintenance of the machine.
- Planning of road marking and calculating the material need.
- Marking up the road / Pre-marking.

