LIPETSK
ROLL FORMING
MACHINERY PLANT

398059, Russia, Lipetsk, Frunze st. 21
Phone: 8-800-200-00-95, +7 (4742) 44-76-44
E-mail: **znpo@lipetsk.ru** Internet: **znpo.lipetsk.ru**

Automatic roll forming machines for metal tile roofing

Distinctive features of our equipment:

1) **Our roll forming machines for metal tile roofing have been in operation in Lipetsk for 10 years, 3 shifts a day, 3.5 thousand tons of profile production monthly - We invite you to visit Lipetsk.**

2) Shafts on the rolling machines are 100 mm in size (thinner shafts tend to sag, thus failing to roll the profile through its center). Rollers are made of tool steel (Ст40Х) with addition of chrome (GOST 4543-71). High precision of tooling is ensured by advanced mill/turn machines manufactured in the U.S. All components subject to heat treatment are hardened until the desirable HRC is reached.

3) Key-and-slot connection, typical for machine industry, is used to connect the roller and the shaft (shaft and roller slotted to accept keys); this allows to avoid readjustment issues with a rolling machine, while extending its lifespan (unlike using pins, when the roller is fixed on the shaft with a screw, with spotting – new holes being drilled in the shaft to screw in during each readjustment on this machine).

4) For a consistently accurate profile geometry and equipment longevity we use more metal per structure. Seeking to reduce the amount of steel material can make the equipment less expensive but strongly not recommended as it affects the product quality, performance and service life of a machine.

5) **Decoilers on our machines have their lifting capacity and drive power doubled, thus allowing to handle heavier coils with the required speed, and can operate being integrated with high-speed production lines.**

6) Power section and electronics do not have Chinese components at all!

7) In our lines we realize an automatic feeding mechanism – after putting the material through the feeder and through the closest mill stand, it is automatically driven and spread over the entire length of the rolling mill until the stamping machine, where it is profiled and then cut for testing, with material wastage reduced to minimum. After testing, the line is running fully automatic. Now, the operator does not have to do all these operations manually.

8) The control panel enables 25 operations performed on the machine in series (instead of five). If paused at any point (e.g. coil replacement), the program will resume exactly from the point where it was suspended. Now it is possible to set up any program at one time, thus excluding the human factor when entering long instruction sequences by portions.

9) The rolling mill is fitted with self-aligning UCP bearing units of shop fabrication, proved by time, (manufactured by TSC, Italy) replacing self-made bearings of worse quality, the alignment of which depends on the quality of casing, of bearing proper and on the accuracy of manual pressing (bearing runout and misalignment).

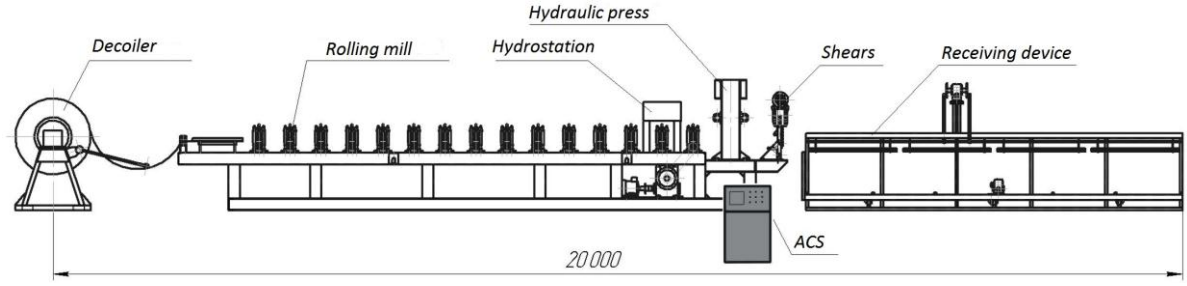
10) The scope of supply includes a kit of indicative and special tools used for machinery set-up and debugging.

Roofing materials

Cold-rolled galvanized steel as per GOST 14918-80 ON, BT; rolled galvanized steel with protective-decorative coating as per GOST 30246-94 and GOST R 52146-2003 (cold-rolled hot-galvanized steel profile with additional polymer coating); sheared edge; 08Ю, 08пс steels. Material width – 1250 mm, thickness 0.3-0.6 mm.

Material producers

Novolipetsk Steel (NLMK), Lipetsk, Russia
Severstal (Cherepovets, Russia)
ArselorMittal Temirtau (Temirtau, Kazakhstan)
Magnitogorsk Iron and Steel Works (Magnitogorsk, Russia)



Advised production line lay-out:

1) overhung decoiler, load capacity 10 tons, remote panel;
2) manual rotary shears (for quick roll change);
3) rolling mill;
4) stamping machine (with oil station);
5) electric-power drive guillotine shears;
6) automatic receiving device with unloader;
7) Automatic Control System (ACS).

General specifications

- Production capacity – **7 sq. m / min** (standard configuration), **9 sq. m / min** (increased capacity);
- Installed capacity – from 25.5 kW (overall capacity with all drives installed on the line), max – 45 kW;
- Space requirements, L x H – from 20 000 x 2 000 mm;
- Operating crew, min. – 1 operator.

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Overhung decoiler (RK-10)
Designed for continuous feeding of material from the coil to the rolling mill, the decoiler has its own control system that coordinates the material feed rate with the running speed of the rolling mill. The decoiler has a design compatible with metal coils made in China (those having the internal diameter of 500 mm).

Blades	3 (4)
Electric motor power, kW	7.5 (15.0)
Size, LxBxH, mm	2780 x 1730 x 1530
Axial load (without supporting leg), kg	10 000
Max. roll width, mm	1270
Inside roll diameter, mm	480-620
Max. outside roll diameter, mm	up to 1500
Thickness of rolled steel, mm	0.3..1.5
Max. linear speed, d=500 mm, meters per minute	40 (65)
Reverse motion	Enabled
Weight, kg	1 800

A 7.5 kW power enables the decoiler to keep pace with the rate of a high-performance rolling mill, the weight of a coil being **10 tons**!!! With less power, e.g 5.5 kW, and rolls heavier than 4 tons, it WILL NOT BE CAPABLE of doing well (at a rolling rate exceeding 24 meters per minute the frequency inverter will give an error message and stop the drive to protect it from overloading).

RK-10 decoiler can be supplied with a mobile trolley having a lift platform. The trolley is employed when an overhead crane has to service several lines, and constantly engaged.

Lifting capacity, kg	10 000
Platform lifting range, mm	from 800 to 1200
Hydraulic station	integrated
Hydrostation capacity, liters per minute	6.1.
Tank volume, liters	25
Nominal pressure, kg per square cm	160
Traveling motor prower, kW	3
Trolley speed, meters per minute	6.5
Travel range, mm	1600
Size (without rails) LxHxS, mm	1350 x 1000 x 975
Basic rail length, mm	4 600

RK-10 decoiler can be equipped with a hydraulic coil-unclamping mechanism – to move the blades together/apart just by pressing one button.

Electric motor power, kW	2.2
Liquid temperature, degrees	-40...+60
Max pressure, MPa	19
Working liquid flow rate, liters per minute	6.1

All decoilers feature a control system (ACS), which enables decoiler operating either manually or automatically.

In manual mode, the decoiler can be rotated forwards or backwards, at low speed (26 Hz).
When in automatic operation, there are 3 speeds available: 25-37-50 Hz (speed of rotation depends on material sagging).
The decoiler can be promptly stopped using the Emergency stop button.

The decoiler can receive feedback from the rolling mill – in case of failure or emergency it will be automatically stopped.

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Shears for quick roll removal
These shears are designed for cutting strips off a roll (e.g. if you need to change it quickly). The basic package by default has hand driven shears – which we do not recommend as, when cutting, the operator is needed nearby to hold the tail of a roll.

With our Automatic Control System (ACS), the rolling mill will be stopped at the exact spot where the last strip of the batch (order) being formed is desired. When cut, the remaining strip of metal is left on the rolling mill to be completely processed and included in an order, thus making the machine unoccupied.

For the operator's convenience, the shears can be upgraded with an electric motor.

Electric motor power, kW	0.55
Supply voltage, V	380
Cut metal thickness, mm	0.35-0.80

Laminating machine (used to apply film prior to rolling)
This machine allows to fix the roll of a protective film and apply this film on a smooth sheet of metal prior to profiling.

Film application before rolling protects the painted surface of a metal from possible damage when transporting, handling and installing the metal roofing on site.

Rolling mill
The rolling mill is designed to gradually profile a smooth sheet of metal until the desired configuration of a profile is achieved. Rolling rate can be up to 50 meters per minute (not to be confused with rolling capacity). The frame of the rolling mill have stands of rolls, profile shears, material feeder equipped with guides and shears for cutting smooth sheets of metal, and electric motor. For safety reasons, the rolling mill has an emergency shutdown device.

Profile type	Mill stands	Weight, kilos	Dimensions, mm			Electric motor power, kW
			Length	Width	Height	
Cascade MP20	15	7 450	9 700	1660	2200	7.5
Cascade MP25	15	7 500	9 700	1660	2200	7.5
Monterey MP24	13	7 300	8 500	1660	2200	7.5
Super Monterey MP25	13	7 300	8 500	1660	2200	7.5
Monterey MP27	15	9 000	9 700	1660	2200	7.5
Joker MP35	18	10 500	11 100	1660	2200	7.5
Shanghai MP30	18	10 200	11 100	1660	2200	7.5
Modern MP20	18	10 400	11 100	1660	2200	7.5
Banga MP44	28	18 000	22 000	1660	2200	15.0
Banga Mini MP25	18	12 000	10 300	1660	2200	7.5
Andalusia MP50	28	18 000	22 000	1660	2200	15.0
Andalusia Mini	18	14 000	12 500	1660	2200	15.0

The rolling mill, in standard line configuration, has an asynchronous electric motor and oil station of 50 liters per minute capacity. Lines with enhanced capacity feature more powerful servomotors and hydraulic systems, which allow to increase line dynamics, reaching a capacity of 9 sq. m per minute.

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High accuracy of machining on working tools is achieved through using new lathe-machining centers of the U.S. origin, with Swedish metal-cutting tools.

Profiling rate, meters per minute	up to 50
Feeder	two shafts and table with guides
Manual rotary shears	in scope of supply, up to 0.8 mm
Shaft size, mm	min 100
Rollers material	tool steel Ст40Х, GOST 4543-71
Tool mounting system	Key-and-slot, mill stand adjustable in all planes
Shafts drive	single- or double-chained with tensioner
Belt movement sensor	optical encoder
Motor control system	ACS with touch panel
Precision of profile geometry	as per GOST 24045-10, GOST 24045-94

For installation purposes, in case of uneven surface, the machinery is fitted with special legs, height adjustable.

Stamping machine
It is designed to form steps on a tapered or corrugated profile to give it a natural roof tile look. The machine is equipped with an oil station, which in standard configuration has a 50 liters per minute capacity.

To increase the line capacity, the oil station is furnished with a more powerful electric motor, heavy-duty pump (100 liters per minute), and hydrocylinders of better throughput.

The oil station has a forced oil cooling system (for normal line operation during hot weather), level indicator in the oil tank, thermometer and oil pressure gauge.

Stamped profile thickness, mm	0.35 - 0.60
Stamped profile length, mm	max 1 300
Stamping cycle per each vertical step (height 14-21 mm), sec	max 1.5
Installed capacity	**7.5 kW –** for 4.5 sq. m per minute **22.0 kW –** for 7 sq. m per minute
Hydrostation – pressure, kg per sq. cm	100
Hydrostation – flow rate, liters per minute	**50 –** @ 4.5 sq. m per minute **100 –** @ 7 sq. m per minute
holder, punch, die	solid
Step depth adjustment, mm	14-21 mm (as required by customer)
Step pitch adjustment, mm	300-450 mm (as required by customer)
Size, SxLxH mm	1660x1000x1200

Die tooling is made on a high-precision machining center manufactured in the U.S.that ensures the maximum precision. This results in high quality of stamping, without damaging the tile coating on high capacity lines.

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Guillotine shears

Shaped blades enable cutting the metal roofing sheet of desired length, doing the job reliably. The machine produces clean cut edges, with no burr, no traces in the cut area, and no metal waste.

Installed capacity, kW	from 3.0
Cut metal thickness, mm	0.3-1.2
Blade shape	Dovetail
Blade position sensors	non-contact
Blade material	ХВГ steel (tool steel), hardening 55..60 HRCэ
Length of products to be cut	any
Dimensions, LxBxH, mm	440x1550x1150
Weight, kg	from 750

For good quality of profile cutting we use dovetail blades, i.e. the profile is being cut from edges towards its center. Unlike conventional guillotine shears (where the product is being cut across, from one edge to the other), blades shaped as a dovetail do not shift the profile during cutting.

In profile manufacturing (another product type) on the line for the metal roofing of Cascade design, the shears must move up and down, as when rolled with no stamping, the material will bump against the blades. For quick positioning, the Cascade metal roofing line is fitted with a device that allows moving the shears quickly up and down manually using a lever.

Sheet edges can be cut to the desired shape (cut repeating the step outline), if the line is furnished with special 3D shape cutting blades.

Roof tile material	Cold rolled steel as per GOST 19904, max tensile strength 380 MPa
Metal width, mm	max 1250
Metal thickness, mm	0.35-0.80
Cutting cycle, sec	max 0.8
Drive	Bevel gear motor КА77-20,25-70-4 kW
Weight, kg	1250

Unlike with ordinary flat blades, which can be ground on any surface grinding machine, 3D blades, if dull, need a special treatment we can provide at our shop, using the machine specially dedicated for this purpose.

Mist Lubrication System

The system is used to apply a lubricant, finely dispersed, on the workpiece before stamping (forming a thin film of lubricant on the surface).

Advantages:
- low lubricant flow rate;
- no spills like with conventional lubrication, spraying the fluid over the material ;
- covering the entire surface of the sheet with a fine film of lubricant.

Size, LxSxH mm	160x215x280
Air working pressure, Bar	8.0
Spray nozzle size, mm	600
Weight, kg	10

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Receiving device with unloader;
Our metal roofing machinery comes with an automatic stacker and trolleys. The receiving device with unloader can be managed by one person.

The standard configuration enables two ways of removing finished products from the line:
- through the top by overhead crane;
- using a trolley on tracks to roll the pallet out.

Size, LxSxH mm	from 6000x1500x1300
Installed capacity, kW	1.5
Weight, kg	from 250

Alternatively, for removing finished products off the line the customer may also choose a lateral unload capability. The length of the receiving device is to be specified when making an order.

Additionally, your metal roofing products can be wrapped on our automatic packaging unit. The unit comprises a packaging machine which is positioned between two roller conveyors. A bunch of roofing sheets being wrapped is fed through the machine at constant rate.

Automatic Control System (ACS)
The line is fitted with an ACS of industrial make, of components supplied from manufacturers in Europe only (Siemens, Schneider Electric, RITTAL), and featuring a touch panel.
The ACS is supported by original software designed for high precision of cutting, ±1mm allowance per 6 meters, provided the roofing product quality is perfect, and the line utilizes high-performamce machinery.

The ACS has three modes of operation:

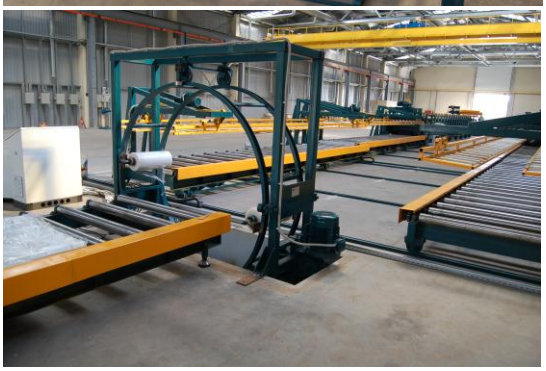
In "**Manual mode**" each device is controlled individually (e.g. blade moving up/down).

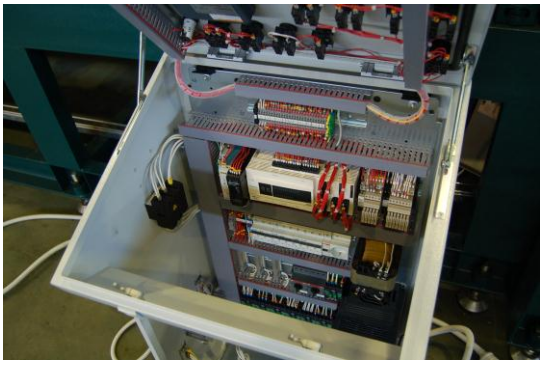
"**Automatic feed**" – after putting the sheet through the feeder and through the closest mill stand, it is automatically driven and spread over the entire length of the rolling mill until the stamping machine to form the first step and then cut for testing in the shears, with material wastage reduced to minimum. From this moment the line is running fully automatic.

In "**Automatic mode**" the operator can program up to 25 instructions at once. When forming the last piece of profile instructed by the program, the machinery will be stopped for a moment to make an "intake cut" (for cutting the roll, forming the last piece of profile in a batch and removing the profile from the rolling mill).

ACS keeps the log of operation and allows exporting these data via USB for review, including 1C Accountant Suite compatibility (this functionality to be agreed with the customer).

Industry design, no Chinese components in the power section and electronics!!!

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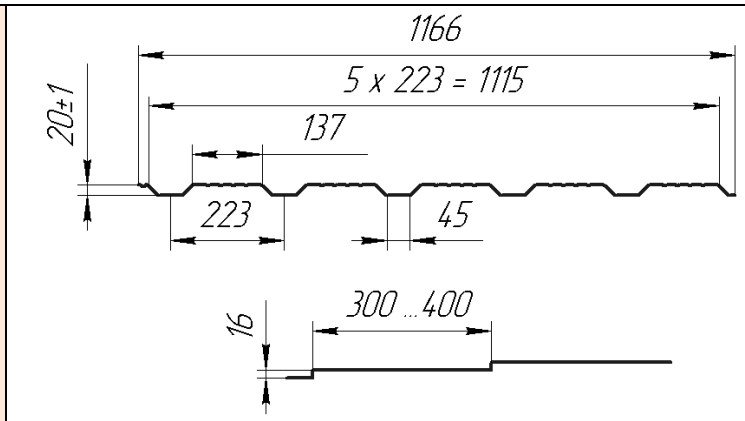
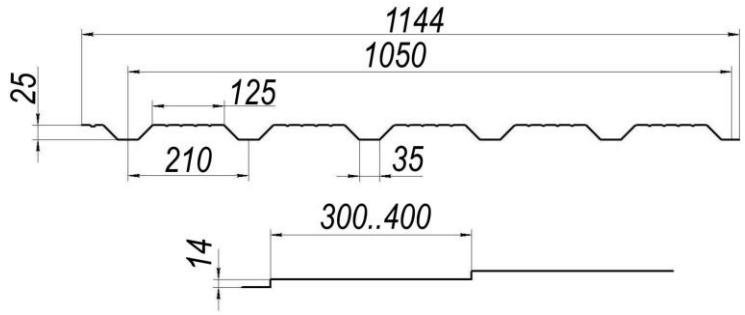
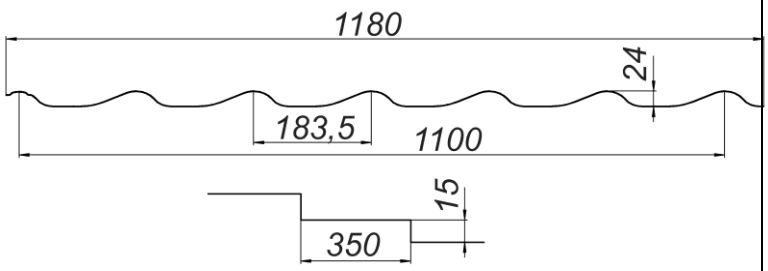
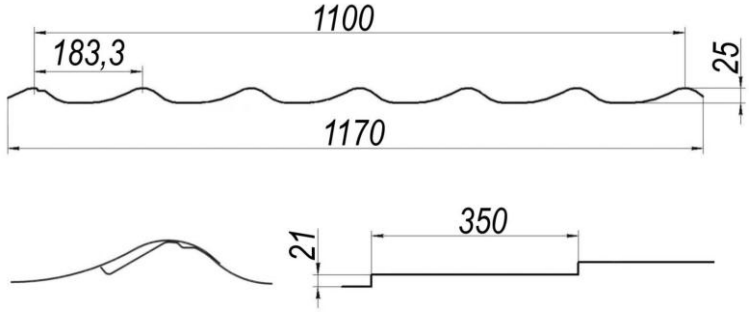
Here you can find the current prices on our fully equipped metal roofing forming lines

Metal roofing product		Mill stands	Machinery price, RUB (VAT included)		
			4.5 m^2/min	**7** m^2/min	9 m^2/min
Cascade MP20-1115 + profile C20-1115 **3 product types**		**15** (metal **0.35** - 0.5 mm)	3 880 000 (62 000$)	**4 250 000 (68 000$)**	5 630 000 (90 000$)
Cascade MP25-1050 + profile C25-1050 **3 product types**		**15** (metal **0.35** - 0.5 mm)	3 890 000 (62 000$)	**4 260 000 (69 000$)**	5 650 000 (90 000$)
Monterey MP24-1100		**16** (**0.35** - 0.5 mm)	3 990 000 (64 000$)	**4 360 000 (69 000$)**	5 690 000 (90 000$)
SUPER Monterey MP25-1100 **Step height – 21 mm, capillary groove**		**16** (**0.35** - 0.5 mm)	3 990 000 (64 000$)	**4 360 000 (69 000$)**	5 690 000 (90 000$)

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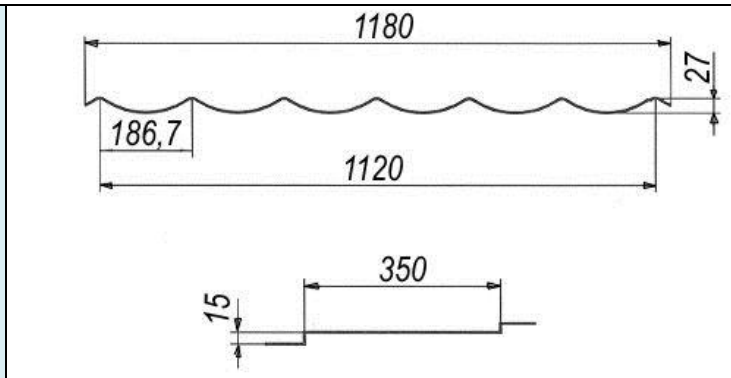
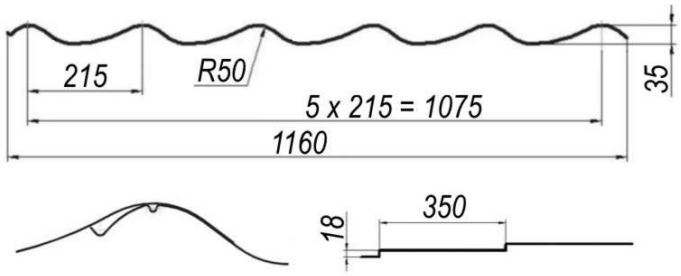
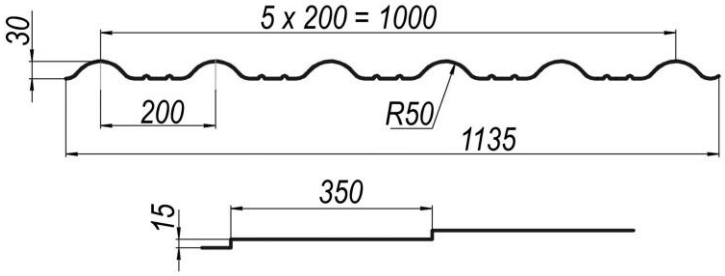
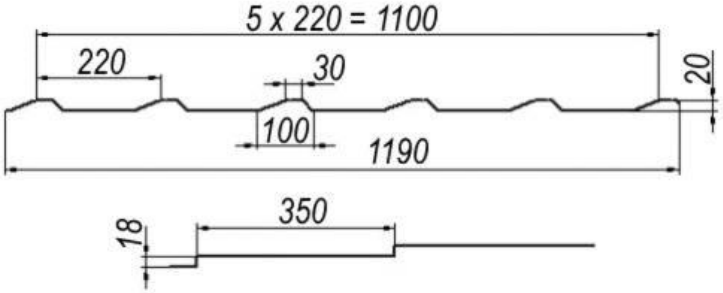
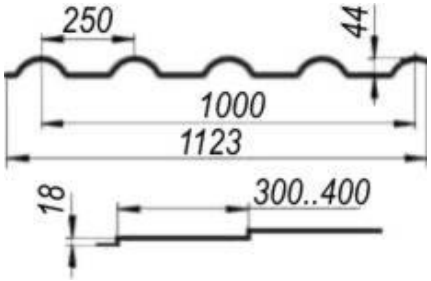
Metal roofing product		Mill stands	Machinery price, RUB (VAT included)		
			4.5 m^2/min	**7** m^2/min	9 m^2/min
Monterey MP27-1120		**15** (metal 0.4 - 0.5 mm)	3 970 000 (63 000$)	**4 340 000 (69 000$)**	5 650 000 (90 000$)
Joker MP35-1075		**18** (metal 0.4 - 0.5 mm)	**4 430 000** (71 000$)	-	-
Shanghai MP30-1000 + profile C30-1000 2 product types		**18** (metal 0.4 - 0.5 mm)	4 260 000 (68 000$)	**4 630 000 (74 000$)**	-
Modern MP20-1100		**18** (metal 0.4 - 0.5 mm)	4 260 000 (68 000$)	**4 630 000 (74 000$)**	-
Banga MP44-1000		**28** (metal 0.4 - 0.5 mm)	**6 390 000** (101 000$)	-	-

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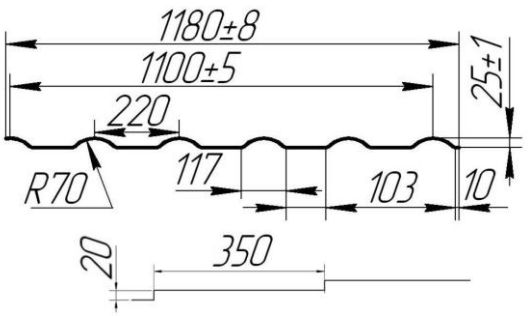
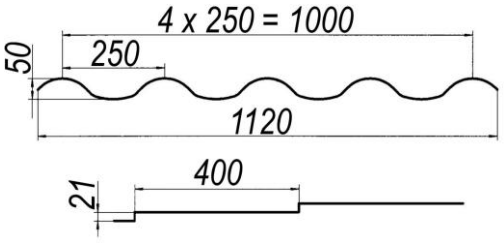
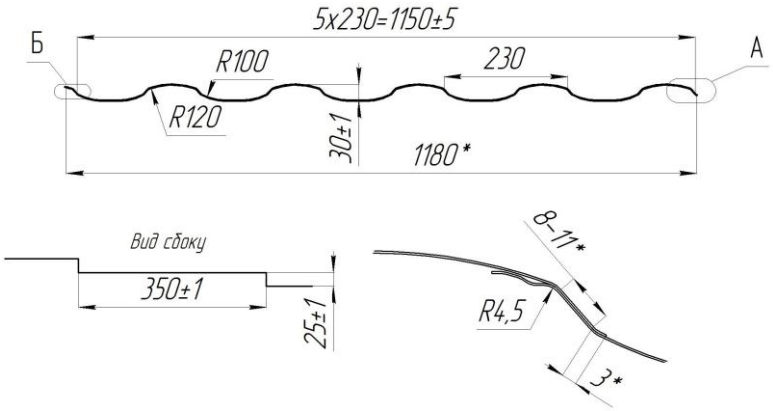
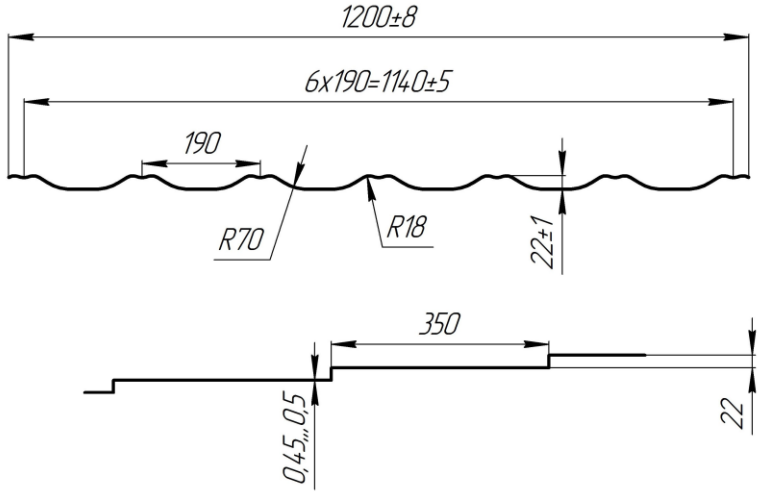
Metal roofing product		Mill stands	Machinery price, RUB (VAT included)		
			4.5 m^2/min	7 m^2/min	9 m^2/min
Banga Mini MP25-1100 **Armorium, Kamea, Decorrey** SPECIALTY!!!		**18** (metal 0.4 - 0.5 mm)	4 140 000 (66 000$)	**4 490 000 (72 000$)**	-
Andalusia MP50-1000		**28** (metal 0.4 - 0.5 mm)	**6 470 000** (103 000$)	-	-
Andalusia Mini MP27-1120 **Adamante, Country** SPECIALTY!!!		**19** (metal 0.4 - 0.5 mm)	4 240 000 (68 000$)	**4 590 000 (73 000$)**	-
Finnera-like roofing **Finnera, Kvinta** SPECIALTY!!!		**16** (metal 0.4 - 0.5 mm)	3 990 000 (64 000$)	**4 390 000 (70 000$)**	-

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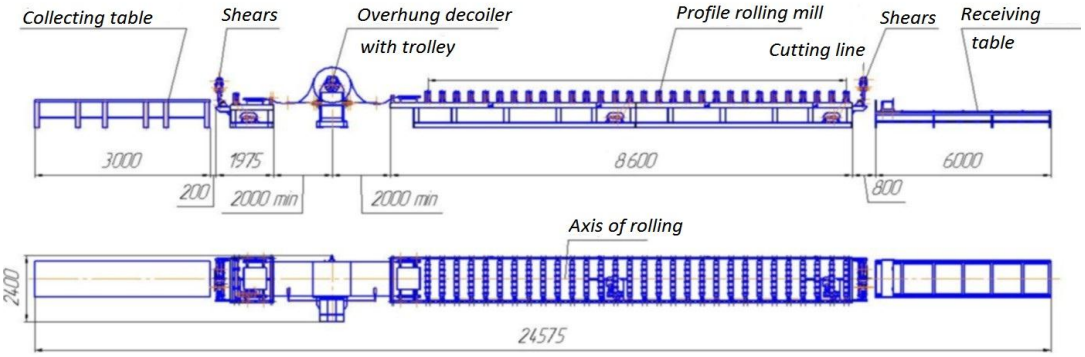
WARNING! Don't be tricked – some unfair sellers try to exaggerate the capapcity of the machinery they advertise. **Production capacity should be measured using a stopwatch, when rolling a few sheets, with stamping, cutting and stacking times considered, too. WHEN OVERLAPPED, SHEETS SHOULD BE PERFECTLY AND FIRMLY JOINED, NO VISIBLE GAPS OR CLEARANCES ALLOWED!**

WARNING! The performance figures indicated have the modifiers like "maximum" or "up to". In a manner of speaking, this is more approximation really. For instance, 5 meters of a finished product per minute does not mean the exact value. It may also be 2 meters or 3 meters per minute. Moreover, achieving a 5 meters per minute benchmark sometimes does not have any sense due to the product quality deteriorated, as when joining profiles together you'll have visible gaps between the sheets. So, increasing the performance causes the stamping quality to deteriorate – metal roofing having gaps between steps with metal sheets overlapped. Besides, shorter times for the rolling mill acceleration and slowdown result in heavy vibrations affecting the accuracy of sheet positioning before stamping and making the machinery behavior unpredictable. That is why, to withstand such challenges, heavy-duty production lines shall have sufficient metal content per structure!!!

Prices on optional machinery (to upgrade the basic configuration):
1) RK-10 overhung decoiler, instead of double-leg model – **RUB 170 000 (2 700$)** extra;
2) 10-ton hydraulic lift trolley for decoiler – **RUB 560 000 (9 000$)**;
3) Hydraulic drum release functionality for overhung decoiler – **RUB 250 000 (4 000$)**;
4) Set of wheels for decoiler movement on rails (without trackway) – **RUB 68 000 (1 100$);**
5) Rotary shears, electrically driven (instead of manual type) –**RUB 50 000 (800$)** extra;
6) Machine for film application on smooth material prior to rolling – **RUB 45 000 (720$)**;
7) Shears with 3D blades for shaped cutting (instead of standard shears) – **RUB 330 000 (5 300$)** extra**;**
8) Mist lubrication system (lubricant application on sheets prior to stamping) – **RUB 165 000 (2 650$)**.
9) Optional manufacturing of 510 mm long roofing sheets (standard length 1015 mm) – extra **RUB 70 000 (1 100$)**;
10) Receiving table with rollers, instead of stacker robot – **minus RUB 125 000 (2 000$)**;
11) CTL Unit (for cutting workpieces; integrated in the line) – **RUB 630 000 (10 000$);**



CTL machine comprises:
1. Feeding device with film applicator;
2. Guillotine shears (capable of cutting metal pieces up to 1.2 mm in thickness)
3. Receiving table or Automatic stacker (optional).

The decoiler and the automatic control system are both taken from our roll-forming line. The roll is put on the decoiler, and the strip of metal is then fed on the cut-to-length line or directly to the roll-forming mill. The control panel of the roll-forming line has a switch to select the direction of strip movement. Cutting accuracy ± 1 mm.

Warranty – **3 years (all units covered, including bearings, motors, gears, and other components);**
Commissioning and personnel training **are included in the total price of equipment (including travel and lodging costs)**;
Terms of payment: **10% - advance payment, 90% - upon acceptance of equipment in Lipetsk.**

Equipment delivery:
1) by truck: one line fits in one covered truck, 12 meter long,
2) by rail: one line can be transported in one 40 ft. container
For lines with profile higher than 44 mm one more transportation unit will be required.

398059, Russia, Lipetsk, Frunze st. 21
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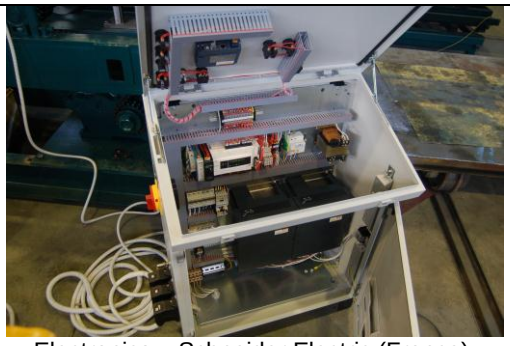
Price reduction options:

1) A cheaper version of machinery automation (ACS) – **minus RUB 100 000 (1 600$);**

	STANDARD CONFIGURATION	**CHEAPER SOLUTION**
Design	 RITTAL automation cabinet (Germany)	 IEK box (China), self-made remote panel
Components	 Electronics – Schneider Electric (France); Buttons, motor protection circuit breaker, switches – EATON (Germany); Relay switches, power supply units – Amron (Japan); To increase measuring accuracy at high rates the optical encoder is fitted with a measuring wheel of Hengstler design (Germany).	 Power electric parts – China (IEK); Weak controller Siemens, Delta (China); Touch panel – Weintek (China); No motor protection CB; Self-made counter on the optical encoder.
Control panel	 Ergonomic control panel of industrial make, can be installed on any side of the rolling mill, buttons – EATON (Germany)	 Control panel – self-made design of remote type, can be mounted only from one side of the rolling mill, complex cabling, Chinese buttons!
Connections	 Terminals and socket outlets – Cabur (Italy)	 Twisted cabling, master switch IEK (China)

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2) Low-duty decoiler – **minus RUB 20 000 (320 $)**;

	STANDARD CONFIGURATION	CHEAPER SOLUTION
Design	 Powerful motors (min 7.5 kW), Electronics – Schneider Electric (France); Buttons, motor protection circuit breaker, switches – EATON (Germany); Relay switches, power supply units – Amron (Japan).	 Small low-duty motor (for slow lines and lighter rolls), Components – IEK (China) No motor protection CB.

A 7.5 kW power enables the decoiler to keep pace with the rate of a high-performance rolling mill, the weight of a coil being **up to 10 tons**!!! With less power, e.g 5.5 kW, it WILL NOT BE CAPABLE to handle a heavy coil (at a rolling rate exceeding 24 meters per minute the frequency inverter will give an error message and stop the drive to protect it from overloading).

3) Low-capacity stamping device – **minus RUB 200 000 (3 200$)**;

	STANDARD CONFIGURATION	CHEAPER SOLUTION
Design	 A 200 liter oil station, 22 kW motor; Station capacity – 100 liters per minute; Two hydraulic circuits; Automatic cooling system, own electric motor.	 A 100 liter oil station, 7.5 kW motor; Station capacity – 50 liters per minute; Single circuit; No cooling; No thermal sensor

With a low-duty oil station installed, stamping cycles will be longer by times, the line capacity being affected heavily.

Finally, with 60 000$ rubles of fair price for the machinery you are trying to save 3 200$, while loosing almost half of its originally designed capacity – is it worth it?

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4) Selecting less rigid structures and low-capacity motors – **minus half of the standard line total**;

The reduced amount of metal per structure and low-performance motors mean too low production and explicitly poor quality of products, plus constant readjustments and repair on your machinery!!!

5) Our warranty is applied only to standard equipment and components (other bought components: bearings, motors, gear, electronics and more will not have a 3-year warranty) – **minus RUB 20 000 (320 $)**.

6) Travel expenses of our start-up technicians at the Customer's cost – **minus RUB (320 $)**.

WARNING!

We strongly do not recommend trying to cut your costs by choosing the price reduction options stated above!

Before placing your order, please find some time to look through photos and videos taken at our production facility to better understand under what conditions and on which machines we manufacture our equipment!

Looking forward to seeing you at our production facility – do not purchase without witnessing the production itself.
Avoid purchasing self-made machinery of doubtful quality!!!