

Fiberglass reinforcement is produced on the basis of approved GOST 31938-2012 and is used in industrial and civil construction.

The reinforcement is made of glass fibers impregnated with a specially prepared binder (compound) by broaching with a spiral periodic profile of glass fiber or polyamide thread.

For production the line 1 which consists of the following elements is used: 1.1. Control panel
Designed to manage and monitor the operation of the technological line.
It consists of a metal body and instrument panel.

One

Twenty three

Four

Five

67

1-furnace temperature control device;

2-the device of adjustment of speed of a broach armatures;

3-frequency adjustment device

the winding ribs of rebar;

4-line emergency shutdown button

(avast);

5 - the control lamp of inclusion of devices

(pulling, furnace, winding ribs);

6 - power button devices (pulling,
furnace, winding ribs);

7 - button off devices (pulling, furnace, fin winding)

1.2. A Creel for bobbins

It is intended for installation of bobbins with threads.

1.3. Impregnation bath with tensioning device

The device is designed for alignment of fibers, impregnated with a resin and winding of the spiral. It consists of a leveling device, impregnation baths with two drums, spiral winding device.

It is a structure mounted on a metal frame.

1.4. The annealing chamber

It is intended for armature polymerization.

It consists of a metal frame, camera body, 12 heating Elements.

1.5. Water cooling unit Designed for cooling valves.

It consists of a metal frame, a metal bath for water drain, a perforated bottom bath for water cooling, a water supply system.

1.6. Haul-off unit/cutting the knot

It is intended for stretching of finished fittings and its cutting.

It consists of a metal frame and a pulling device installed on it (four spring-loaded rollers, a roller drive, etc.). engine, control panel) and cutting mechanism.

1.7. Armature winder

Designed for winding the finished valve in the Bay. It consists of a winder, a drive and an El. engine's.

1.8. Device for twisting the roving

Designed for twisting the roving into thread.

It consists of a metal frame, two twisting spools, drive and El. engine's.

Used material:

1. 2400/4800 glass roving (Tex – filament thickness)
2. Epoxy resin (type ED-20);
3. Mtgf ISO hardener;
4. Accelerator Alcofen;
5. Plasticizer DEG-1.
6. Adhesive tape for packaging of finished products
7. Stretch film;
8. Packing label.

Production works on a shift schedule. Production personnel of one shift (crew) consists of: 1. Senior operator;

2. Production line operator; 3. Packer's.

Supervises teams, provides economic and household activities of the enterprise Head of production.

To work on the production line are allowed workers who have been instructed on OT and TB, acquainted with the instructions on OT and TB and these technological regulations.

Each of the workers of the production shift should be responsible for the work of individual units and mechanisms, as well as the quality of the ongoing production processes and the quality of the finished product:

Senior operator. He is the head of the brigade. All crew members are subordinate to the senior operator. During operation control area:

- rack for the spools of roving (perhaps the formation of nodes of an optical fiber, impulses, ensures timely garter new Bobin);
- tension shafts, impregnation baths with tension devices (the number and consistency of mixed resin components, impregnation and pressing of the binder, the formation of fiberglass knots, thread gusts);
- spiral winding device (reliable fastening of nuts, free running of the bobbin with twisted glass fiber, prevention of thread gusts, timely replacement of coils, constancy of the winding step, splicing of threads with gusts);
- control panel (control and adjustment of the temperature in the annealing chamber, as well as the speed

broaches and spiral winding devices, temperature control in the impregnation bath with a pyrometer). Zero

The temperature of the binder should be within 20 C.

- the device of twisting and rewinding of roving (the amount of winding of roving on the spool, the formation of roving knots, gusts);

- cleaning the impregnation bath, shafts, drums.

Production line operator. Control zone:

- quality of reinforcement (excess resin, polymerization);
- mixing of binder components;
- bath cooling (cleaning of the accumulated strands of the roving);
- the pulling device and the input node of the cutting device (control of the uniformity of the input

products into the pulling device, the absence of foreign objects in the area of the entrance to the pulling device, in case of detection of improper operation of the pulling device immediately stops the line and reports to the senior operator);

- control panel of the cutting device (control and adjustment of the length of products); - winding of finished products, warehousing; - cleaning of impregnation bath.

Packer. Control zone:

- the cutting system (work disk, movable plate, the return mechanism);

- winding of the finished product;

- quality of reinforcement (excess resin, polymerization, measuring the diameter of the reinforcement); - control of the armature winder;

- packaging, design, warehousing of finished products;

Production staff is engaged in both the production of finished products and daily / every shift, periodic (TO1, TO2, etc.) maintenance of equipment.

PRODUCTION PROCESS

The production process consists of 3 stages 1. Preparation of equipment, 2. Work, 3. End of work: BEFORE WORK:

1. Inspect the premises, safes, cabinets with tools for integrity locks, check the integrity of the tool and goods and materials. Upon detection of loss / damage immediately report to the head of production;

2. Conduct an external inspection of the entire line for external damage, finding foreign objects, check the integrity of the wiring, grounding, control panels;

3. Open the rebar annealing furnace. Clean the internal surfaces of the furnace from excess resin. Clean the glass cloth lying on the bottom of the furnace, wipe the thermocouples of the temperature

meters. Check the integrity of the asbestos Board (if necessary, replace), put the cleaned fiberglass on the bottom of the furnace (if necessary, put a new one); ATTENTION: cleaning the furnace is performed only on the "cold", otherwise the furnace is deformed and fails!

4. Fill the roving from the rack into the impregnation bath, winding unit, stretch manually through the furnace, pulling device, cutting unit;

Diameter of reinforcement Number of threads. 2400 Tex.

IMPORTANTLY:

The number of threads listed in Table No 1 does not always coincide with a certain diameter, so you should measure the diameter of the armature at the outlet of the 1 caliper. If necessary, adjust the number of threads.

1. Make sure that the fiberglass on the bottom of the furnace lies flat without folds close the furnace, tighten all screws tightly;

2. Turn on the annealing furnace;

3. Inspect the pulling device for the presence of resin sticking, roving on the

pull rollers. If there is any sticking – remove with a knife or other object WITHOUT damaging the rollers after loosening and, if necessary, removing the clamping spring brackets;

4. In the case of pulling an unformed rod (not impregnated with roving resin), the clamping screws of the rollers of the pulling device must be fully pressed. When pulling, BE CAREFUL with the measuring mechanism of the armature length meter!;

5. Check the cleanliness of the cooling bath strainer. To do this, close the ball valve on the bath, gently Unscrew the filter sump and clean the filter mesh. This operation cannot be performed while the pump is running, as this will cause damage to the pump!

6. Conduct an external inspection of the armature winding, roving rewinder for damage, oil leaks from the reducers;

7. Fill the bobbins with roving in the rewinder, start winding the roving on the bushings;

8. Add water to the cooling bath to the mark (20 mm from the edge);

9. To start the preparation of the binder:

To prepare the binder, use MIDDLE scales, plastic buckets, measuring cups. First, the resin is poured into the consumable bucket, then the hardener. Stir for 2 minutes with a drill with a mixer nozzle. Then, in a thin stream, without stopping stirring, an accelerator and a plasticizer are added.

In any case, do not violate the proportions of mixing the components - this will lead to MARRIAGE of products and damage to the components!

14. During the preparation of the binder, fill the roving in the winding unit, make sure that the annealing furnace has reached the desired temperature:

The diameter of the valve chamber Temperature annealing 4 0 260-270 C

6 0 280-300 C

8 0 300-320 C

10 0 310-330 C

12 0 330-350 C

15. Pour the binder into the bath, start working with impregnation, winding.

IN OPERATION:

1. Senior operator monitors the placement of operators, quality, safety of work and product quality;
2. The whole team focuses on the armature broaching, its passage through all the nodes of the line, pre-set the resin spin on the drum, spin after the drum. Control the quality of valves at the outlet.
3. Pay special attention to the pulling device, its setting. For uniform pressing of rollers it is necessary to adjust them to compression of 10-15 mm on height of a pressure spring, to check up absence of slippage of rollers;
4. Set up the reader of the counting mechanism. It should rotate without slipping, be clean;
5. Check the meter counter setting on the indicator;
6. At the beginning of the work, in the middle of the shift, 3 hours before the end of the shift to check the length of the armature in the Bay (if necessary, adjust the meter to indicator);
7. Check every hour with a caliper the diameter of the armature (for compliance with TU), check the ellipse (if necessary to adjust the tension of the roving);
8. Follow the correct setting of the armature winder. Do not give excessive tension, as this will cause the motor to overheat. The tension should be such as to ensure uniform (without jerks and sagging) movement armature in winder;
9. The rebar cutting process is carried out by 2 operators. As soon as the circular saw begins to cut the second operator approaches and together with the first see off armature to the winder and disconnect the winder drive. Produce fixing fittings ties or tape, remove the finished Bay, fill the following ends of the fittings, include the drive of the winder. This sequence is MANDATORY, otherwise the winder works unstable, which complicates the process;
10. To follow the passage of the roving in an impregnating bath. The movement should be uniform without overlapping threads. The main spin occurs on the drum, the additional spin unit. The quality of the rebar directly depends on the quality of the spin. Fittings should be without excess resin (drops), but at the same time not dry. The adjustment process is controlled visually by the standard.
11. Timely follow the rewinding of the roving for the outer braid. The roving should be wound uniformly without slippage of the sleeves. The process of rewinding begins with refueling and fastening the threads to the coils, then the Twister is turned on, then the winder. Off first then scratchy winder. The on/ off sequence is MANDATORY, otherwise the thread quality is not appropriate;
12. Timely change the thread on the winder. The change process is carried out by 2 operators in the shortest possible time 10-15 seconds. This is IMPORTANT because it affects the quality of the finished product;
13. Monitor the nodes, mechanisms of the line in the process. If there are deviations in the work (knocks, extraneous sounds, short wiring, etc.) immediately notify the head of production and start Troubleshooting;
14. Monitor the quality of finished products, correct packaging, labeling in accordance with GOST 31938-2012;
15. IN case of fire in the annealing furnace, do not OPEN the FURNACE! Plug the holes with a damp cloth;

16. In the process of working on a host of winding is not near the rotating winders. BE CAREFUL when manipulating the change of threads (work carried out together), as a violation of safety regulations can lead to injury;

17. To monitor the implementation of safety requirements when working with resins and solvents. Use personal protective equipment;

AT THE END OF THE WORK:

1. To assemble the binder of the impregnating baths;

2. To stretch dry the valve (without resin) to the exit of the annealing furnace;

3. Disable all mechanisms of the line;

4. Remove the reels from the impregnating bath, the other removable parts, rinse thoroughly solvent;

5. Carry out a thorough cleaning of all fixed elements of the line from resin residues;

6. Clean the area of preparation of the binder. To clean up the Straits, if necessary replace the cardboard;

7. Brush away the chips from the armature from the pulling device, the cutting unit, the winder armatures;

8. Wipe the annealing furnace, roving Twister, control panel from dust and deposits;

9. Conduct an external inspection of all units and mechanisms of the line for the presence of damage, deviations from normal condition;

10. Inspect all electric motors. Grille on the fan side

the water must be clean; 11. Pack, mark finished products; 12. Fill in the production report indicating the number of products produced,

used components, the number of marriage. Report to the head of production on the end of the shift;

13. Clean up the tool, TMC in the allotted places, turn off all electrical appliances on the input Board, lock all rooms and cabinets, hand over the key to the security post.