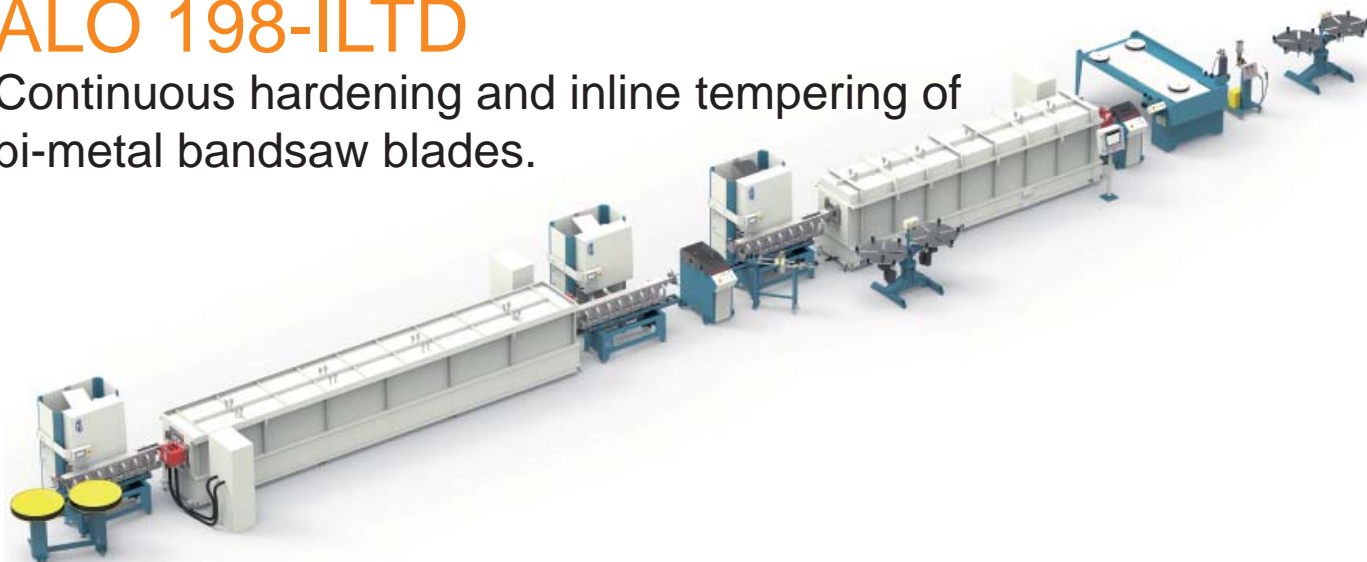


ALO 198-ILTD

Continuous hardening and inline tempering of bi-metal bandsaw blades.



ALO 198-ILTD Mk.IV. is one of the fastest and most cost effective system compared to other bi-metal hardening systems on the market.

- Can be operated with 2-3 times higher speeds compared to other systems.
- Reducing your energy consumption dramatically compared to pit furnace concept.
- Reducing your energy consumption with 30-50% compared to other alternative system.
- Process time and cost will improve dramatically when minimizes the handling and operations such as recoiling- straightening and separate tempering operations.

Thanks to:

- Induction pre-heating with Litz coils before hardening and tempering furnaces.
- Properly insulated furnace system with high quality heating elements.
- Highly efficient Quick Quench system.
- Multi band feed system with exceptional well controlled band feeding and tensioning.
- A Central PLC that is handling all process parameters.

THE SYSTEM COMPRISES:

2 times band feed units.

Induction generator and work coil for pre-heating before hardening.

High temperature hardening furnace.

Quick Quench after hardening.

Induction generator and work coil for pre-heating before tempering 1.

Tempering 1 furnace double muffle.

Quick Quench after tempering 1.

Induction generator and work coil for pre-heating before tempering 2.

Tempering 2 furnace double muffle.

Quick Quench after tempering 2

Circulation and cooling system for generators and work coils

Master control panel and power distribution system.

Flying shear & take-up speed control (option)

(Optional band coiling systems available)

HIGHLIGHTS:

- One in line operation complete hardening and tempering operation.
- High output capacity, up to 4 meters/minute.
- Short lead time, 6-8 minutes from coil to coil.
- Low cost/meter band produced.
- Eliminating recoiling and separate tempering operation.
- Reduce or eliminate need of camber straightening.
- Low energy cost thanks to induction band pre heating.
- Low cost and high capacity Quick quench system.
- Full process control and coil histogram by central control table.

CAPACITY:

Band width:	20 - 80 mm	¾ - 3.165"
Band thickness:	0.9 - 1.6 mm	0.035 - 0.063"
Speed example,	27 x 0.9 mm:	3.0 - 4.0 m/min



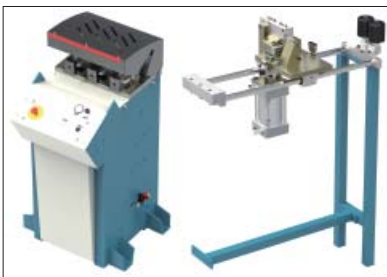
Take up coiler. Picture 1



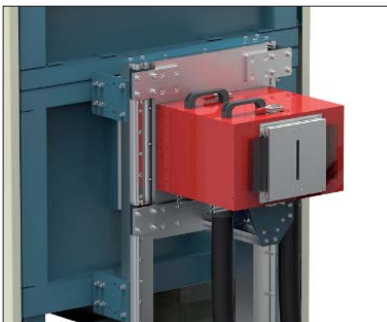
ALO Cube Elevator system. Picture 2



The band loop generate a loop of band, this will give time to weld coils together. Picture 3



Band feed unit. Option: Flying shear. Picture 4



Tempering 1 pre-heating inductor. Picture 5

MACHINE DESCRIPTION

Optional Band Coiling System (picture 1 and 2)

Pay off and take up double coilers

Double coilers built on a sturdy welded stand.

Pay off is unpowered with friction brakes.

Take up is driven by an AC motor with gear box.

Equipped with folding coil protector and expandable centers which can be removed to facilitate loading.

Cube pay off and take up system

The Cube will dock to a hydraulic elevator that automatically locks the Cube.

From the elevators control panel each cube-shelf can be indexed by the operator. On the take up side, the cube elevator also is equipped with power unit for singel coil drive.

Optional Band loop accumulator (picture 3)

The band accumulator will towards end of each coil be activated to generate a loop of band. This will give time to weld coils together and facilitate continuous hardening/tempering.

Band feed/tensioning unit (picture 4)

The system includes two band feed units, one single band feed and one double band feed. The speed is infinitely variable between 0 - 5m/min and the torque can be set to give the optimal controlled tensioning of the band in the hardening furnace. All band feeding units are monitored and controlled by the central PLC line control for optimal band feeding. A protective fold away cover over the drive systems are also included.

Option: The second band feed unit can be equipped with a flying pneumatic shear for cutting band samples.

Induction preheating before hardening and tempering (picture 5)

Band is pre-heated by induction before entering the hardening furnace to allow band maximum time at temperature for proper transformation. The furnace have a preheating unit capable of heating the bands up to approx 750°C.

After the preheating coils, the band temperature is monitored and reported to the PLC system. By using Litz-coils, the induction heating efficiency rate will be significantly better than other available technologies in the market and capable to deliver 80-90% of energy consumed to the band compared to 30-50% for conventional induction systems. Induction coils are designed as separate flat coils on both sides of the band and thereby easily open for service.

The output power is continuously controllable by frequency converter and a current breaker protects the generator in the event of a short circuit or overload.



Hardening furnace. Picture 6

High temperature hardening furnace (picture 6)

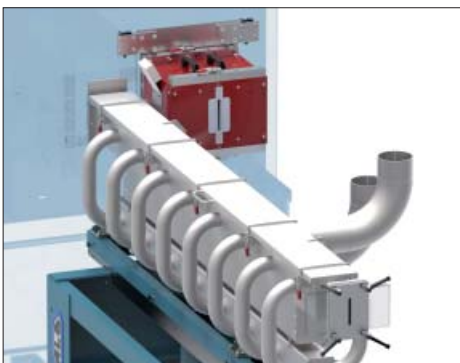
The high temperature muffle furnace is designed and build for hardening temperature of approximately 1160 – 1220 °C and divided into six separate heating zones, with totally 60 kW to be distributed individually to each zone. The furnace is made of a stable steel casing with a separate ceiling section. The ceiling can be swing opened for easy access to the heating chamber for service reasons. The heating elements are arranged freely radiating in the furnace walls and are designed for an intrinsic temperature up to max 1380 °C. The muffle and band guides are made of a high temperature resistant alloy, Inconel 602, and kept it in a straight condition by an automatic mechanical stretching device.



High velocity nitrogen gas quenching zone. Picture 7

Quick Quench zone (picture 7)

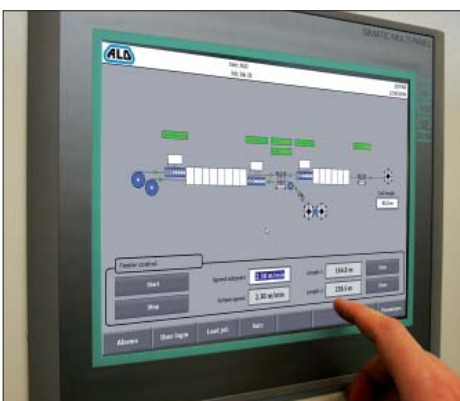
The quick quenching of the hot band is done by high volume of cool protective gas soaking both sides of the band. The gas is circulated in a closed loop system to avoid colorization or scale on the band. The hot gas is effectively cooled in a gas/water heat exchanger tank. The blower head is equipped with an air filter and blocks of nozzles that can be adjusted to match different band widths to optimize the quenching effect. The blower unit head is placed on a special floor stand allowing muffle expansion and retraction as well as a larger side movement for easy access to muffle.



Tempering 1 and 2 double muffle furnace. Picture 8

Tempering 1 and 2 double muffle furnace (picture 8)

The furnaces has a double muffle to allow the band go through the same furnaces twice in opposite directions. This make the whole line more compact, saving floor space and reduce the price of the system. The muffle furnaces are light weight construction, made of rectangular profiles and angle-iron bars. In order to obtain a low surface temperature the outer shutting is distanced from the furnace body. The furnace body is insulated with a multi-layer made of light-weight ceramic blocks and ceramic fibre boards.



Siemens Comfort Touch Panel 15". Picture 9

Master control panel (picture 9)

The electrical power supply is modular by the use of Schneider Canalis that simplify installation and allowing future modifications and/or upgrading of the line. The setting- handling and control of all process parameters is executed in a Profi Bus D.P. system as mastered by a Siemens S7 1200 PLC unit. All data is entered and presented on a Siemens Comfort Touch Panel 15". Import or export of process data is available via an Ethernet communication module.

Software includes:

- System set up by band recipe handling
- Central monitoring and recording of related parameters.
- On line graphic presentation of process data
- External communication via Ethernet module
- Band batch and coil histogram recording

TECHNICAL SPECIFICATION:

Band width:	20 - 80mm	0.787 - 3.165"
Band thickness:	0.9 - 1.6 mm	0.035 - 0.063"
Air pressure:	6.3 bar	91 psi
Mains voltage:	400 VAC \pm 10% 3-phase, 50-60 Hz \pm 1%, directly earthed system	
Power consumption at max. output power:	170 kVA	(complete system)
Preheating HF generator, hardening max. output power:	37 kW	
Preheating HF generators, tempering max. output power:	24 kW	

SPEED AND ENERGY CONSUMPTION EXAMPLE:

27 x 0.9mm	3.0 – 4.0 meter/min	57 – 68 kWh
34 x 1.1 mm	2.0 – 2.8 meter/min	55 – 63 kWh
42 x 1.3mm	1.5 – 2.3 meter/min	
54 x 1.3 mm	1.0 – 1.5 meter/min	
67 x 1.3 mm	1.0 – 1.3 meter/min	
67 x 1.6 mm	0.8 – 1.2 meter/min	
80 x 1.6 mm	0.6 – 1.0 meter/min	

TECHNICAL SPECIFICATION HARDENING FURNACE

Type of furnace:	Electrically heated pull-through muffle furnace	
Process:	Austenitizing of HSS	
Approx. operating temperature:	1160 -1230°C	2120 - 2246°F
Approx. connected power:	Approx. 60 kW	
Heating power:	Approx. 60 kW	
Approx. weight:	4800 kg	10582lb

TECHNICAL SPECIFICATION TEMPERING FURNACE

Type of furnace:	Electrically heated pull-through muffle furnace	
Process:	Tempering of HSS	
Approx. operating temperature:	600 - 750°C	1112 -1382°F
Approx. connected power:	Approx. 12 kW	
Heating power:	Approx. 12 kW	
Approx. weight:	3000 kg	6614lb

TECHNICAL SPECIFICATION DOUBLE PAYOFF COILER. (OPTION)

For more information please refer to our brochure ALO 830

TECHNICAL SPECIFICATION CUBE PAYOFF SYSTEM. (OPTION)

For more information please refer to our brochure ALO 104

Other customer requirements on request.

