
THE HEAT-TECHNOLOGY INSIDE
55 years
product
catalog 2016
BALÇIK ISI ELEMANLARI
SANAYİ TİCARET ANONİM ŞİRKETİ

HEATING ELEMENTS

STEM THERMOSTATS

WELDED TUBES

TUBE SHAPING & PROCESSING

FURNACE BRAZING

BRIGHT ANNEALING

MILESTONES

1959 Heating Element Division Founded
1959 First Branch in Ulus, Ankara
1970 First Workshop in Ostim, Ankara
1977 First Export to Europe
1994 Became the distributor of Kanthal
1996 First Branch in Karaköy, Istanbul
2000 First plant in Kazan, Ankara
2001 Heating Element Production Technology *Renovation*
2002 Tube Division Founded
2003 Company Managemental Ownership *Change*
2004 Corporate Organisational Restructuring
2005 Plant expansion in Kazan, Ankara
2006 Acquisition of Tormec s.n.c. from Italy
2007 Furnace Brazing and Furnace Bright *Annealing Technology*
2008 Metal Treating Division Founded
2009 Second Branch Bayrampasa, Istanbul
2010 Plant renovation in Kazan, Ankara
2011 Heating Element Production Technology *Renovation*
2012 Automation Production Technology Investments for Heating Elements of Cooking *Appliances*
2013 STF Sealing Technology
2014 Plant expansion in Kazan, Ankara
2015 Corporate Organisational Restructuring
2016 Double Safety Stem type Thermostat Technology Release

BALÇIK is one of the world's leading heating element manufacturer, which was founded in 1959 by the honorary president of our corporation, Mr. Süleyman BALÇIK in Ankara, Turkey. As being a family owned corporation managed by the third generation with over 50 years history, today we became the focus of experience, quality, trust and innovation within the heating elements industry by the brands of BALÇIK and TORMEC.

Beginning with the heating elements manufacturing, we have gradually expanded our activities. Our corporation is currently manufacturing and providing services with it's capabilities in it's four different divisions;

1) Heating Element Division; Production of Tubular Heating Elements for Domestic and Industrial Applications.
2) Thermostat Division; Production of Stem type Thermostats for Domestic Water Heating Appliances.
3) Tube Division; Production of Stainless Welded Tubes integrated with Tube Shaping, Processing, Assembling Capabilities.
4) Metal Treatment Division; Services of Furnace Brazing, Bright Annealing and Electroless Nickel Diffusion Coating.

Our success is driven by our difference in the industry, with our variety in product, production and service ranges. By high tech products - production abilities, we are aiming to provide added value to our products, our customers and also to our the country. We are currently continuing our manufacturing activities at our headquarters and production facility located in Kazan, Ankara with over 10 millions of pieces production capacity, 200 employees, on 6500sqm.

The acquisition of an Italian well known Water Heating Element and Stem type Thermostat manufacturer TORMEC in 2006 has strengthened BALÇIK's position as one of the leading manufacturer in the industry, by expanding the product range with Thermostats. Presently our products are reaching to our hundereds of customers in 5 continents / 45 countries, which is supported by our our sales offices and logistics warehouses in Istanbul, Turkey.

BALÇIK, identified it's brand with providing high quality products and services, has VDE, CE product quality and ISO 9001:2000 system quality certificates since 2001 and 2002 respectively and continually updated these in line with international standards over the years.

With more than half century history, BALÇIK aims to be a solution partner for our customers; develops special solutions and products with its unique production technology, provides logistics support with its flexible and fast production infrastructure and represents the technology, efficiency, quality and trust with its experienced staff.

VISION
For providing high tech, energy and cost efficient, long lifetime products to the industry, continuing to the research and development projects together with the new techological and automation investments.

MISSION
Partner for our customers; develops special solutions and products with its unique production technology, provides logistics support with its flexible and fast production infrastructure and represents the technology, efficiency, quality and trust with its experienced staff.

VALUES
Transparency
Innovativeness
Competitiveness
Customer Orientation

BALÇIK WITH NUMBERS
55 Years History
Two Brands
Ten Millions Production Capacity
Two Hundered Employees
6.000sqm Built, 20.000sqm Open Production Facility
Two Sales Offices and Logistic Warehouses
Export to 45 Countries in 5 Continents
Participated more than 25 International Exhibitions
Three Quality Certificatations
Hundreds of Business & Solution Partners Worldwide

BALÇIK ISI

Tormec THE HEAT

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FURNACE BRAZING

Brazing has often been overlooked by designers, possibly due to a poor historical image. The modern brazing process and materials are a far cry from this perception however - it has become an exceptional joining process that makes possible engineering assemblies with joint strengths that cannot be achieved by any other means.

BALÇIK Metal Treatment division is the one of the well known furnace brazing specialist in Turkey for multi-jointed components in Stainless Steel.
The process and technology was developed primarily due to the requirement of the brazing of heating elements at first, but afterwards BALÇIK has founded this division to become a service center for brazing requirements of the market.

Furnace Brazing

Often referred to as Mesh Belt Brazing, Bright Brazing, Nickel Brazing, Copper Brazing, Continuous Brazing, Atmosphere Brazing.
An ideal process for very low to very high volume parts in steel or stainless steel. Carried out under a reducing furnace atmosphere resulting in a clean component & one requiring no post braze cleaning.

Brazed stainless steel parts must always be clean and bright, and have precise micro structure requirements for strength and corrosion resistance properties. Most of conventional and typical brazing or annealing processes cannot reliably meet these requirements. Our furnace brazing system will provide you with superior results at a fraction of the cost our old technology processes charge.

Our Parts are Always Bright and Always Right

Guaranteed Punctual Delivery
The furnace brazing process, along with our unique efficiency systems, guarantees you receive prompt deliveries. We serve customers throughout Turkey and Europe with precise deliveries and reduce the lead times for the brazing and heat treating process. Your parts do not spend time at our facility; they are delivered immediately and with the quality you expect.

Better Processes
Our use of pure atmospheres and continuous furnaces is unique. This combination produces the cleanest brightest parts with the strongest joints. These conditions are ideal for stainless steels. Your parts will meet the exacting standards of the design expected by your customer.

Best Service

We are open 24 hours per day, seven days per week. We run your parts when you need them and can work weekends to meet unexpected demands. We are on time. You are not surprised with expediting costs or entanglements.

Capabilities

- Base Metals
- Mild Steel
- 300 series Stainless Steels
- 400 series Stainless Steels
- Carbide
- Tungsten
- Copper

Braze Alloys
Copper
Nickel
Silver

What is Brazing

Brazing is a process in which two metals are joined together using a filler metal whose melting point is above 840° F but below the melting point of the base metals being joined. The filler metal is distributed between the closely fitted metal surfaces by capillary action.

Typical Applications
The list of potential applications is substantial, however, the most common categories are:

- Hydraulic Fittings
- Heat Exchangers
- Tube Manipulations
- Machined Assemblies
- Pressed Assemblies
- Fabrications

Wire Formed Assemblies

Joint Design

Brazing relies on capillary attraction. Therefore, the joint design is crucial in the success of the brazing. An unbroken capillary path with gaps not exceeding 0.1mm are required for most applications.
Whenever possible, joints should be self-supporting or self-jigging as furnace jigs can be expensive, they may move in the heat during the process and they occupy furnace space adding to the unit costs.

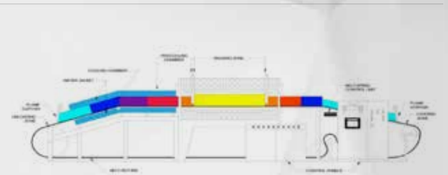
Joint Strength

A correctly designed and brazed joint should produce a strength of joint that is in excess of the parent metal.

Advantages & Disadvantages

Furnace Brazing is still one of the least appreciated manufacturing techniques with many engineers being unaware of its existence or its advantages as a method of joining two or more parts together.

FURNACE BRAZING



Main Advantages of Furnace Brazing:

- Stronger assemblies. Joint strengths greater than the parent metal are possible. Parent metals are not fused or damaged. Permanent joints.
- Produce extremely clean brazed parts with superior, flux-free braze joints of high integrity and strength.
- Complex assemblies from common parts. Furnace brazing facilitates the manufacture of complex & delicate assemblie which might be impossible to achieve by any other method.
- Multi-joint processing in a single pass. Multiple joints can be brazed at once.
- The process is a semi-automatic process used due to its adaptability to mass production. Main advantage is the ease with which it can produce large numbers of parts per hour.
- Efficient designs (e.g. stainless and mild steel combinations). Dissimilar metals can be brazed together.
- Long and inaccessible joints can be filled successfully.
- Different metal thickness are permissible in brazed joints.
- Leak-tight and attachment properties.
- Lighter weight components.
- Elimination of special tooling or fixtures. Components to be brazed can be designed for self alignment without the need for fixturing.
- Elimination of other processes like machining, staking or threading.
- No need for post braze cleaning operations.
- Uniform stress relief throughout. Stresses are relieved during brazing. Residual stresses are reduced due to slow heating and cooling cycles. This, in turn, can significantly improve the thermal and mechanical properties of the material, thus providing unique heat treatment capabilities.
- The parts are uniformly heated under tight process control. A uniformed heating & cooling rate can reduce the potential for distortion. A controlled heat cycle minimizes or eliminates distortion.
- No surface deterioration takes place during the process.
- Rapid reproducible results are obtainable.

Disadvantages of Furnace Brazing:

- Close fits are necessary to facilitate the capillary action.
- Component parts will be annealed during the process.
- Provision for location of the brazing material has to be allowed for in the design.

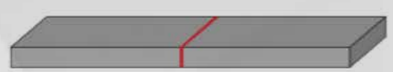
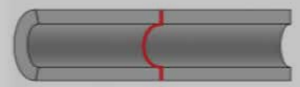
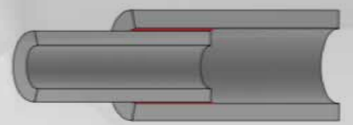
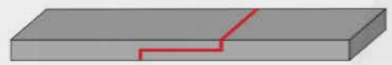
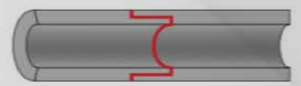
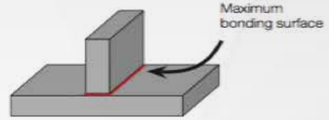
Braze filler metal base material

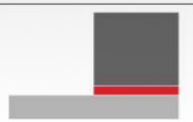
Base material	Nickel (Ni)	Silver (Ag)	Copper (Cu)
Braze range	927 - 1205 °C 1700 - 02200°F	620 - 980°C 1150 - 1800 °F	705 - 1150°C 1300 - 2100°F
Maximum useful service temperatrue	980°C 1800°F	370°C 700°F	370°C 700°F
Applications	Alloy steels Carbon steels Copper alloys Stainless steels Nickel/cobalt alloys	Alloy steels Carbon steels Cast iron Copper alloys Nickel alloys Stainless steels Tool steels	Alloy steels Carbon steels Cast iron Copper alloys Stainless steels Tool steels
Brazing methods/ atmospheres	Dissociated ammonia	Dissociated ammonia	Dissociated ammonia

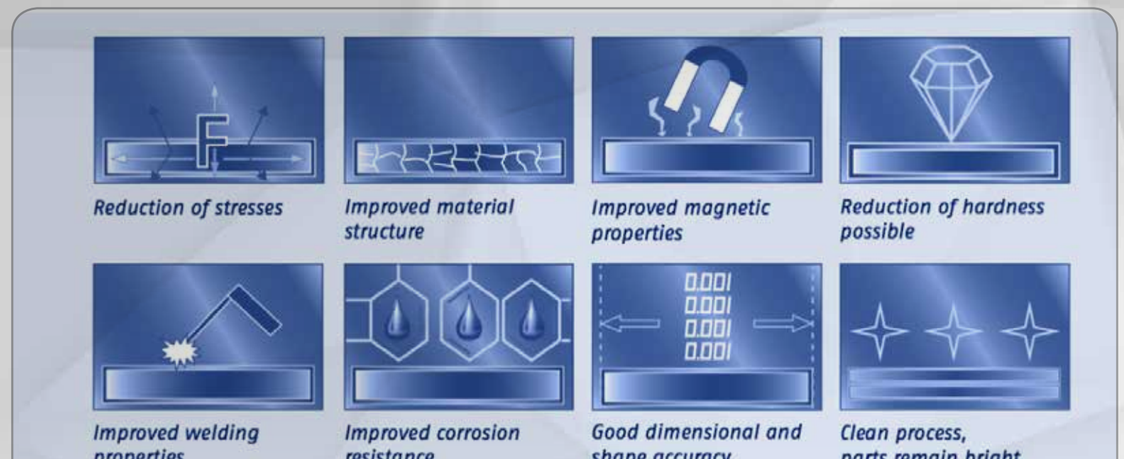
Braze filler metal application by base material

Brazing filler metal	Aluminum and aluminum alloys	Carbon steel and low alloy seetls	Cast iron	Ceramics	Cobalt and cobalt alloys	Copper and copper alloys	Magnesium and magnesium alloys	Nickel and neckel alloys	Stainless steell	Titanium and titanium alloys	Tool steels
	Base material of component										
Nickel based [BNi]		●	●		●	●			●		●
Copper (pure) [Bcu]		●	●			●		●	●		●
Copper phosphorus [BcuP]						●					
Copper-zinc [BCuZn]		●	●			●		●			●
Silver based [Bag]		●	●	●		●		●	●	●	●

Joint configuration

Joint type	Flat parts	Tubular parts (cutaway)
Butt joint		
Lap joint		
Butt-lapp joint		
Scarf joint		
Tee joint		

	Capillary force enhanced brazing	Filler material in place
Before brazing		
During brazing		
After brazing		



BALÇIK Metal Treatment division uniquely placed in having continuous furnaces for bright annealing in Turkey. This is giving us capability of bright annealing service for larger lower volume parts & smaller very high volume parts.

A highly technological heat treat process performed to the parts by a carefully controlled furnace atmosphere resulting to a clean, smooth, scale free metal surface.

Bright annealing is carried out in a furnace full of Hydrogen (H2) at temperatures ranging between 1040 ° C and 1100° C and is followed by a rapid cooling. The Hydrogen is NOT an oxidising agent and therefore no surface oxidation is created and pickling is no longer required after the bright annealing.

The main advantage of this technology, besides a bright and even surface that eases further processing of the tubes, is the improved corrosion resistanc. Such treatment, carried out at the production process, ensures the complete solution of the possible carbides precipitated at the grain border, thus obtaining an austenitic matrix free of defects. This makes it possible to avoid the dangerous phenomena of intergranular corrosion.

WHICH PART WOULD YOU PREFER ?

THEIRS OURS

OURS THEIRS

The austenitic structure obtained through bright annealing, is homogeneous with regular grain size; the consequence is an improvement of stainless steel tensile properties, in particular traction and elongation, with an increase of plasticity and a decrease of residual stress.

Reducing the hardness and minimizing residual stresses prepare metals and alloys for further processing or for the intended service conditions. Materials facilitating the progress of subsequent manufacturing operations, by improved machinability with ease and increased ductility.

Our continuous furnaces provide outstanding heating and cooling cycle performance. Quality is evident in our signature surface finish. There is never any haze, scale or heavy oxidation. Quick turnaround times are not a problem.
Stainless steels are ideally suited to our system. Special fixtures are not required. We achieve superior results versus vacuum processes at a fraction of the cost.

Services

- Bright Anneal
- Stress Relief
- Normalizing
- Tempering

Base Metals

300 series Stainless Steels
400 series Stainless Steels
Mild Steels
Other Ferrous alloys
Nickel alloys

Processes

High efficiency continuous furnaces
Pure hydrogen atmospheres
Pure nitrogen atmospheres
Heat lot tracking

NICKEL DIFFUSION COATING

Diffused nickel plating is the most effective nickel coating to ensure the highest levels of corrosion resistance via the total encapsulation method of plating. The process is done at elevated temperatures in a controlled chamber. As a result, the base metal develops extreme resistance to corrosion, oxidation and erosion in its severe working conditions.

Diffused nickel plating is proven to be more corrosion resistant than even the highest grade stainless steel. It is so resistant to corrosion, even in marine subsea environments increasing the longevity of components, and by this way that our customers give mild steel plated in this way 30 year sub-sea guarantees.

When independent salt spray testing was carried out on diffused nickel plated components, the experiment was abandoned after 2000 hours because no corrosion could be detected.

Benefits;
Extends the life of materials, such as mild steel
Highly cost-effective
Downtime as a result of corroded parts is severely reduced or avoided altogether
The costs of repairing, replacing or maintaining parts can be dramatically reduced or avoided altogether

Provides;
Exactly same coating thichness on all the surface of tube
High corrosion resistance
High resistance against chemicals
High resistance to degradation
Hard to stick surface
Slickness on the surface
Hardness
Ductility
Solderability

Diffused Nickel Plating difference in comparison to Electroless Nickel Plating
What is different between the two methods of Nickel Plating, is the way in which the processes are undertaken. It has already been deciphered that Diffused Nickel Plating occurs via a total encapsulation plating method but this is not the same for Electroless Nickel Plating. This occurs when a layer of metal is deposited of even thickness all over the surface of a component, despite the shape of it. This uniform coating is perfect for components which are used in industries, such as, Healthcare, Defence, Automotive and Aerospace, where the components are often not standard and need to be hygienic.

BALÇIK Metal Treatment division's diffused nickel plating process is the highest standard for corrosion resistance via the plating process.

DEGRADATION OF NICKEL DIFFUSION COATING IN DIFFERENT ENVIROMENTS		
Enviroment	Temprature (°C)	Degradation Ratio (Micron/Year)
SEA SALT WATER %3,5	95	NONE
ACETIC ASID	20	0.8
AMMONIUM SULFATE	20	5
ASCETONE	20	0.8
AMMONIA %25	20	16
AMMONIUM NITRATE %20	20	15
AMMONIUM SULFATE DILUTED	20	3
BENZENE	20	NONE
CALCIUM CHLORIDE %42	20	0.2
CARBON TETRA CHLORIDE	20	NONE
CITRIC ACID DILUTED	20	200
IRON CHLORIDE %1	20	200
FORMIC ACID %88	20	13
HYDROCHLORIC ACID %5	20	24
LACTIC ACID %85	20	1
LEAD ACETATE %36	20	0.2
NITRIC ACID %0,1	20	25
OXALIC ACID %10	20	3
PHENOL %90	20	0.2
PHOSPORIC ACID %85	20	3
POTASSIUM HYDROXIDE %50	20	NONE
SODIUM CARBONATE DILUTED	20	1
SODIUM HYDROXIDE %45	20	NONE
SODIUM HYDROXIDE %50	95	0.2
SODIUM SULFATE %10	20	0.8
SULFURIC ACID %65	20	9
ACIDIC WATER (Ph3.3)	20	7
DISTILLED WATER	100	NONE

Coating Properities	Electrolytic	Diffused Nickel
Composition	%99+Nickel	Average %2-15P and %98-85 Ni
Appearance	Dull to Bright	Half Bright
Structure	Crystal	Amorphous
Density	8.9GR/CM^3	Average 7.9 GR/CM^3
Thickness Distribution	Variable	%10
Melting Point	1455°C	890°C (Average)
Hardness	40-150 VSD	500-600 VSD
Hardness after Heat Treatment	Ineffective	1000 VSD
Degration Resistance	Moderate	Very Good
Corrosion Resistance	Good (Poriferous)	Very Good
Magnetic Susceptibility	%36	%4
Electrical Resistance	7 MİKROOHM/CM	60-100 MİKROOHM/CM
Thermal Conductivity	0.16 CAL/CM.S.°C	0.10-0.02
Elongation %	6 - 30	2

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