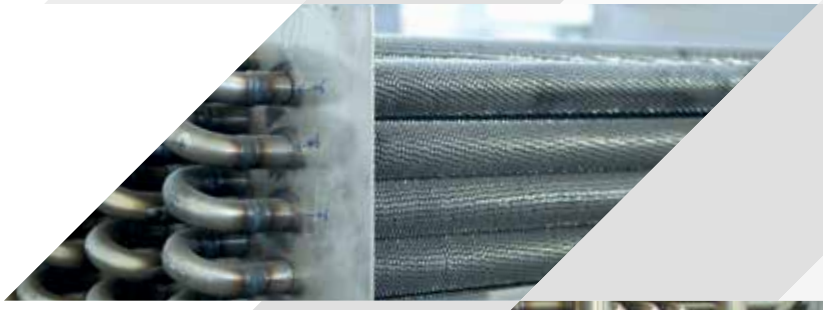
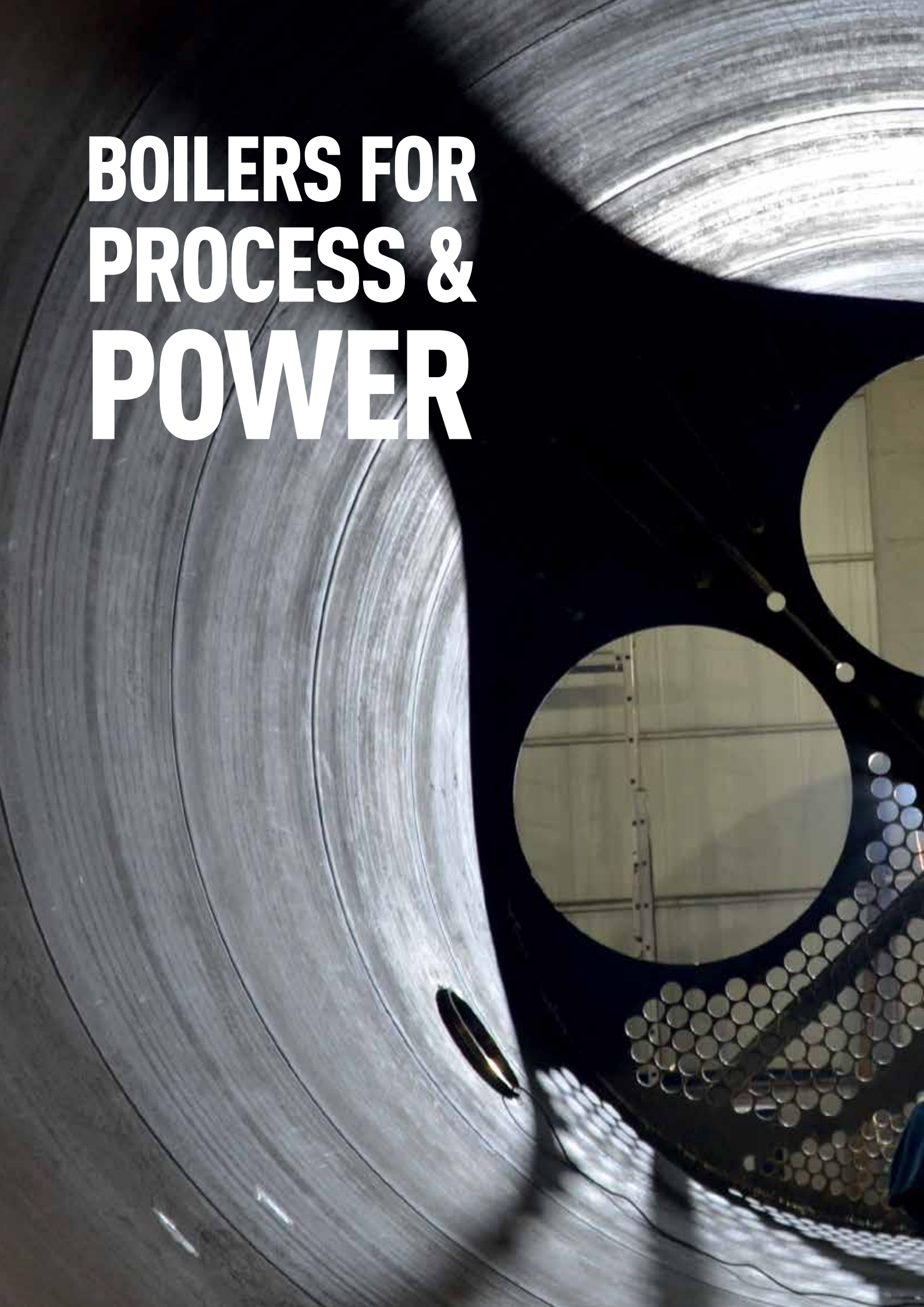
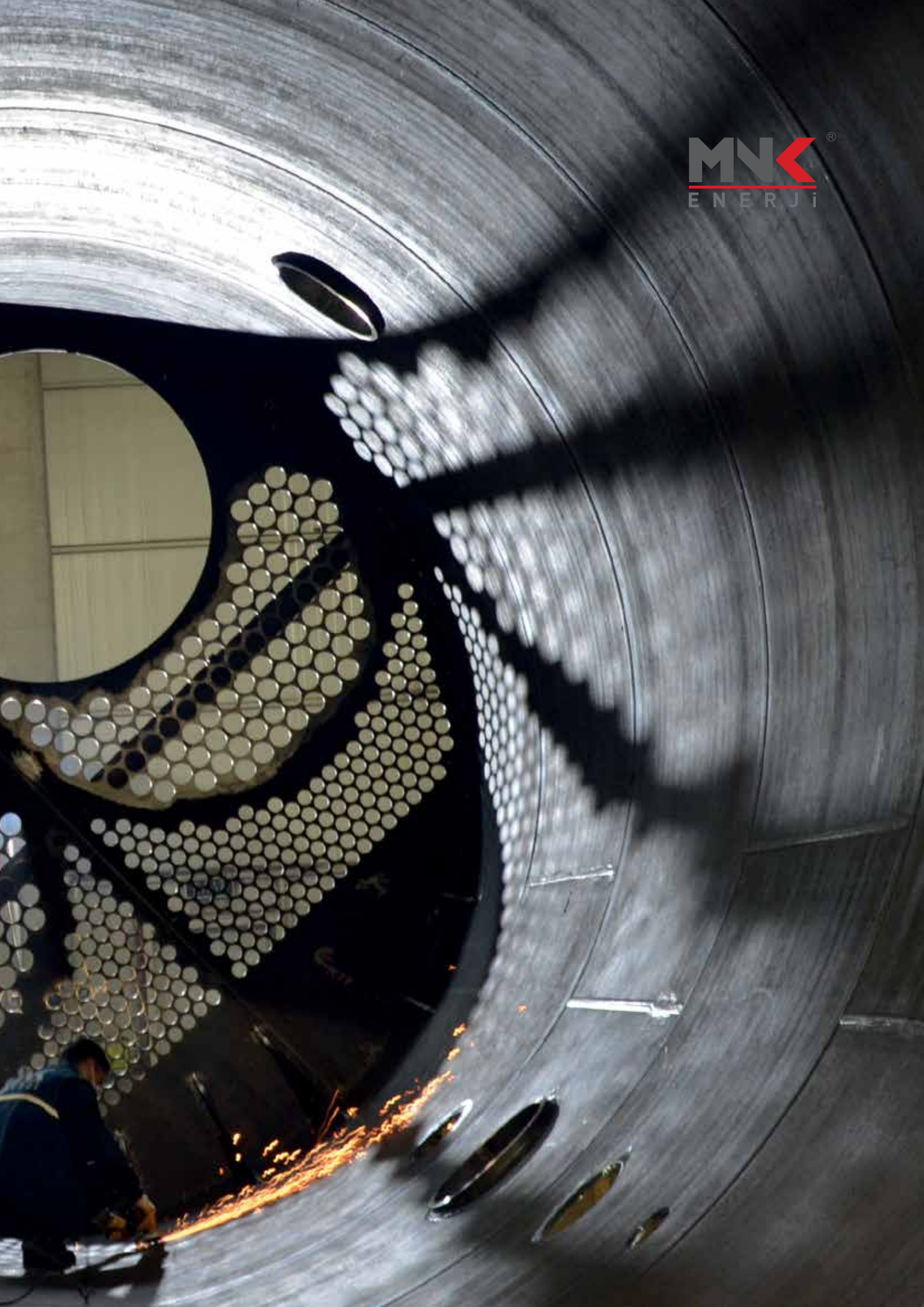
www.mnkenerji.com



MNK
ENERJİ



BOILERS FOR PROCESS & POWER


MNK
ENERJİ

Steam Boiler
Shell Boiler

Key Features

Steam	Saturated or Superheated
Fuel Types	Gas, Oil, Hydrogen
Capacity	up to 70 t/h [1]
Pressure	up to 30 bar_g [2]
Efficiency	up to 105% [3]
Design Life	30 years
Emission	<20 mg/kW

1) with twin furnace
2) depends on capacity
3) based on sensible heat

Shell Boilers are used to produce Saturated and Superheated Steam are also called Scotch Type in Industry.

Food, dairy, textile, paper, chemical process industries pressure and capacity requirements are medium-sized. The most ideal solution for such process steam requirement is shell boilers.

Shell Boilers provides ease of production, operation and maintenance with its cylindrical and 3-pass construction. The furnace where the combustion takes place is made as corrugated. Its biggest advantages over water-tube boilers are, not sensitive to water quality and responds to peak steam capacities.

It is easy to make maintenance and repairs when it is necessary to reach and observe all of the heating surfaces. It is possible to commission very quickly by delivering skid mounted on burner, pump, economizer, control panel, etc. equipment.

Advantages

High efficiencies which are 95% can be obtained with the feed water economizer, 97,5% with the recuperator and up to 105% with the condensing economizer according to the sensible heat.

Long life is ensured by using machining methods in all welded preparations and with World-class welding equipment and welders.

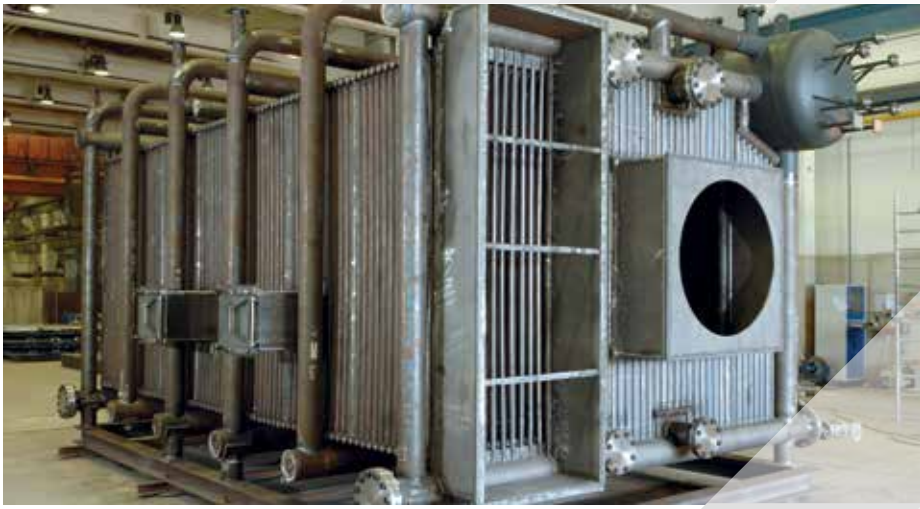
Low Emissions are achieved thanks to the perfect integration between the boiler and the burner.

Thermodynamic performance is achieved by calculation with specially designed software and proven by site tests.

No water fluctuation in the boiler because of well design homogeneous heat flow.

Refractorless design on burner and doors eliminates the problems and increase the efficiency with water-cooled chamber between the burner connection plate and the furnace.

Steam Boiler
Water-tube



Water-tube Steam Boilers are used to produce Saturated and Superheated Steam where high pressure, high capacity, rapid steam production and excellent steam quality are required.

Water-tube Steam Boilers are produced in standard sizes, as well as special productions in different sizes according to the customer's request.

Continuously welded membrane combustion chamber with Tube-Fin-Tube is resistant to thermal shocks with its water-tube construction. Water-tube boilers can produce steam at different pressures(HP, LP) in the same structure.

The most commonly used are Mono-drum and D-Type double drum type water-tube steam boilers. Once-Through type steam boilers, which can be used in processes which is possible stable steam consumption, are also used.

Key Features

Steam	Saturated or Superheated
Fuel Types	Gas, Oil, Hydrogen
Capacity	up to 290 t/h
Pressure	up to 136 bar_g
Efficiency	up to 105% [1]
Design Life	30 years
Emission	<20 mg/kW

[1] based on sensible heat

Advantages

High efficiencies which are 95% can be obtained with the feed water economizer, 97,5% with the recuperator and up to 105% with the condensing economizer according to the sensible heat.

Long life is ensured by using machining methods in all welded preparations and with World-class welding equipment and welders.

Self-supporting frame system maintains easy installation which makes any hanging of the boiler unnecessary.

Thermodynamic performance is achieved by calculation with specially designed software and proven by site tests.

Quick load variations are possible without significant changes of steam pressure.

Quick start-up generates very quick steam production because there are neither long overflow distances nor long distances from heating surface to drum on waterside.

Waste Heat Boiler

Key Features

Steam	Saturated or Superheated
Water	Sub-heated and Super-heated
Capacity	up to 300 t/h
Pressure	up to 136 bar_g
Steam Temperature	up to 530°C
Gas Temperature	up to 1.700°C

Waste Heat Boilers are used to produce Saturated and Superheated Steam are also called HRSG in Industry.

Waste heat boilers produce hot water, saturated or superheater steam while cooling the flue gases resulting from combustion or exothermic reaction.

Waste heat boilers can be produced with smoke-tube or water-tube and are preferred according to process conditions which are pressure and capacity.

If the gas stream is clean and the gas flow large water tube boilers with finned tubes are used as the boilers are compact.

As MNK, appropriate material selection according to the possible corrosion effect of the flue gases and online/ offline cleaning methods are integrated according to their contamination.

Advantages

High efficiencies is achieved by choosing appropriate pinch and approach points.

Long life is ensured by using machining methods in all welded preparations and with World-class welding equipment and welders.

Thermodynamic performance is achieved by calculation with specially designed software and proven by site tests.

Vibration analysis is performed, and trouble-free operation is obtained.

High frequency welded spiral finned tubes used for clean gases makes compact design boiler.

Resistance welded rectangular finned tubes used for dirty gases makes compact design boiler.

Supplementary Fired Waste Heat Boiler

Supplementary Fired Waste Heat Boilers are used to increase cogeneration overall efficiency by burning additional fuel after the gas turbines.

Supplementary firing is an excellent way to generate additional steam in cogeneration plants.

Since the sensible heat recovered in the economizer in waste heat boilers is small compared to the heat of evaporation, most of the flue gas is thrown into the atmosphere without being used.

This waste heat is recovered in the economizer by increasing the evaporator capacity.

In addition, while 93% of the LHV value of the fuel is used in normal gas fired boilers, almost 100% is used in additional combustion boilers.

The oxygen required for additional post-combustion is provided by the oxygen in the exhaust of gas turbines operating with high excess air.

Key Features [1]

Steam	Saturated or Superheated
Capacity	up to 35 t/h
Pressure	up to 60 bar_g
Efficiency	up to %100 [2]
Steam Temperature	up to 530°C
Gas Temperature	up to 1.000°C

1) for 5 MWe Taurus 60, bigger turbines are available
2) based on sensible heat

Advantages

High efficiencies is achieved by choosing appropriate pinch and approach points.

Long life is ensured by using machining methods in all welded preparations and with World-class welding equipment and welders.

Thermodynamic performance is achieved by calculation with specially designed software and proven by site tests.

Fresh Air Fire steam generation operation is available when the turbine is not operating.

High frequency welded spiral finned tubes used for clean gases makes compact design boiler.

Condensing economizer can recover very significant amount of heat by cooling the flue gas.

Steam Accumulator

Key Features

Steam	Saturated
Volume	up to 300 m^3
Pressure	up to 30 bar_g
Efficiency Increase	up to %20 [1]

[1] *depends on process*

Steam accumulator is a kind of energy storage system for storing the steam.

Steam is storing in high-temperature water with a sensible temperature difference. Then, when desired, a lower level of sensible heat difference is created and evaporation takes place.

The steam accumulator is used to store the steam formed in batch exothermic reactions so that it can be used continuously.

For example, the use of the discharge steam of steam-cured aerated concrete in AAC production facilities as a preheating steam of another charge is one of the best examples.

Steam Accumulator for Peak Capacity

Some processes have instant peak steam needs. For these needs, peak capacities are increased by using the steam accumulator instead of making the boiler capacity large.

Advantages

High efficiencies is achieved by recovering the waste steam.

Different pressure level operation is possible with fully automatic control system.

Peak steam need is maintaned by low investment cost.

Steam charging and discharging in same time are possible.

Quiet operation with specially designed ejector system.

High steam purity is maintaned by steam seperator which integrated internally.

Fired Steam Accumulator

Fired Steam accumulator is a hybrid version of steam accumulator and fired smoke tube boiler.

For conventional peak steam system consists two major component, a small boiler and a steam accumulator.

These two components were integrated into a single system.

The volume of the boiler was designed in accordance with the peak capacity. Steam separation similar to accumulators is integrated in the boiler.

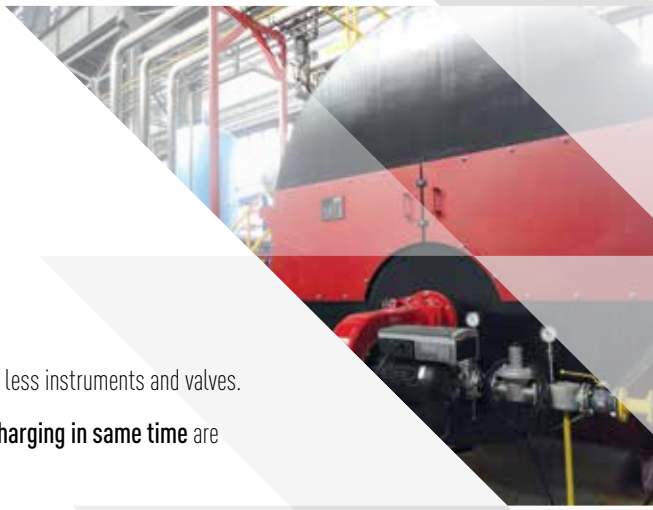
In case of waste steam in the facility, this waste can be stored in the steam accumulator.

The integration of the two systems increases efficiency, decreases breakdown and maintain easy operation.

Key Features

Steam	Saturated
Capacity	up to 30 kg/s
Pressure	up to 30 bar_g
Efficiency Increase	up to %20[1)]

[1)] *depends on process*



Advantages

High efficiencies is achieved by eliminating the steam loss.

Different pressure level operation is possible with fully automatic control system.

Peak steam need is maintaned by low investment cost.

High steam purity is maintaned by steam seperator which integrated internally.

Automation is maintaining less instruments and valves.

Steam charging and discharging in same time are possible.

Quiet operation with specially designed ejector system.

Thermal Oil Boiler

Key Features

Thermal Oil	Liquid and Vapour [1]
Fuel Types	Gas, Oil, Hydrogen
Capacity	up to 24 MWt
Pressure	up to 30 bar_g
Temperature	up to 400°C [1]
Efficiency	up to 105% [2]
Design Life	30 years
Emission	<20 mg/kW

1) with vapour thermal oil

2) based on sensible heat

Thermal oil boilers are used to reach high temperatures at low pressure.

The chemical, textile, power and process industries need heat transfer with a high temperature fluid. The most ideal solution for such process steam requirement is smoke tube boilers.

To reach these high temperatures, thermal heat transfer oils are used, which still remain in the liquid phase at these temperatures. The most important issue to be considered in order for organic and synthetic thermal oils to last for many years without deterioration is the thermal oil film temperature.

Therefore, thermal oil boiler construction is made coil type spiral liquid tube. This spiral structure also forms the combustion furnace.

As MNK, the connection between the 1st pass and the 2nd pass is designed as wet. Thus, refractory is not used in the rear reversal cell.

For extremely high temperature vapour thermal oil system is using.

Advantages

High efficiencies which are 94% can be obtained with the recuperator and up to 105% with the condensing economizer according to the sensible heat for hot water generation.

Long life is ensured by using machining methods in all welded preparations and with World-class welding equipment and welders.

Low Emissions are achieved thanks to the perfect integration between the boiler and the burner.

Thermodynamic performance is achieved by calculation with specially designed software and proven by site tests.

Refractorless design on burner and reversal chamber eliminates the problems and increase the efficiency with water-cooled chamber between the burner connection plate and the furnace.

Air Preheater
Recupurator

Combustion Air Preheater so-colled recupurator are used to increase boilers efficiency by increasing the temperature of the air entering through the burner.

One of the most convenient solutions to decrease consumption of fuel for same steam demand or increase production of steam with same consumption of fuel.

With less fuel burned, less CO2 will be released into the environment. Therefore CO2 emissions will also be the least.

The economizer tube distribution is designed as full cross flow so that the air and flue gas flow homogeneously through the economizer.

With the oxygen-trim integrated recuperator, fuel savings are achieved by providing an excellent fuel/air mixture.

Gas inlet/outlet, bottom and top reversal chambers are completely bolted and have a modular design.

There is easy access for cleaning and maintenance.

Key Features

Fluids	Combustion Air
Heat Transfer Surface	Bare tube
Pressure Drop	<10 mbar
Design Life	30 years

Advantages

Energy Saving between 1,5% and 10% is achieved in boiler or plant efficiency depending on the boiler flue gas outlet temperature, the state of the existing boiler and the type of fuel.

Specially designed system for easy and fast installation.

High efficiency with the most optimum flue gas output possible.

Compact design thanks to optimally tube to tube layout design.

Thermodynamic performance is achieved by calculation with specially designed software and proven by site tests.

Durable, reliable and long-lasting thanks to the manufacturing stages mandated by the standards.

Feed Water Economizer

Key Features

Fluids	Superheated Water
Heat Transfer Surface	Finned tube/Bare tube
Fin Type	HF Welded Solid / Serrated
Material	Carbon/Stainless Steel
Design Life	30 years

Feed Water Economizers use to increase boilers efficiency by increasing the temperature of the feed water.

The most convenient solution to decrease consumption of fuel for same steam demand or increase production of steam with same consumption of fuel.

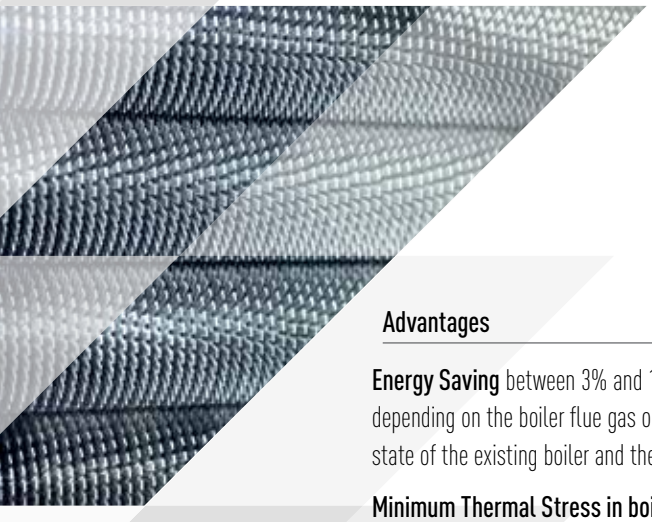
With less fuel burned, less CO2 will be released into the environment. Therefore CO2 emissions will also be the least.

Feed Water Economizers provides optimization about heat transfer surface with its finned tube design.

Feed Water Economizers are produced as finned or bare tube according to the flue gas condition(clean or dirty)

Gas inlet/outlet, bottom and top reversal chambers are completely bolted and have a modular design.

The finned tubes used are high frequency welded. Thus, a full heat transfer between the fin and the tube is ensured for many years.



Advantages

Energy Saving between 3% and 10% is achieved in boiler depending on the boiler flue gas outlet temperature, the state of the existing boiler and the type of fuel.

Minimum Thermal Stress in boiler with closer water inlet temperature to saturated steam temperature.

Proportional Level Control integrated economizers provides excellent operating for boilers.

Crossflow Design to ensure that the water and the flue gas flow homogeneously throughout the economizer.

No Evaporation in the economizer thanks to optimum tube design and continuous circulation with proportional feeding.

Durable and Reliable due to the manufacturing steps required by the standards.

Thermodynamic performance is achieved by calculation with specially designed software and proven by site tests.

Condensing Economizer

Condensing Economizers are used to increase plants efficiency by generating the hot water that needed in plant.

Depending on the type of fuel burned, there is a significant amount (<20%) of water vapor in the flue gas. This water vapor contains latent heat. If the flue gas cool down below the temperature corresponding to the saturation pressure of the water vapor, condensing will start.

For example, if we cool the flue gas up to 40°C in a 10 ton/h natural gas-fired steam boiler, 450 kW of condensation energy will be recovered additional to the sensible heat.

With less fuel burned, less CO2 will be released into the environment. Therefore CO_2 emissions will also be the least.

Key Features

Fluids	Hot Water
Heat Transfer Carrier	Finned tube/Bare tube
Fin Type	HF Welded Solid/Serrated
Welding Technology	High Frequency Welded
Material	Thermoplastic/Stainless Steel
Design Life	20 years

Advantages

Energy Efficiency can be reach up to %105 compared to sensible heat of Lower Calorific Value of the fuel.

Specially designed system for easy and fast installation.

Compact design thanks to optimally pipe and pipe layout design.

Full Crossflow Design to ensure that the water and the flue gas flow homogeneously throughout the economizer.

Durable and Reliable due to the manufacturing steps required by the standards.

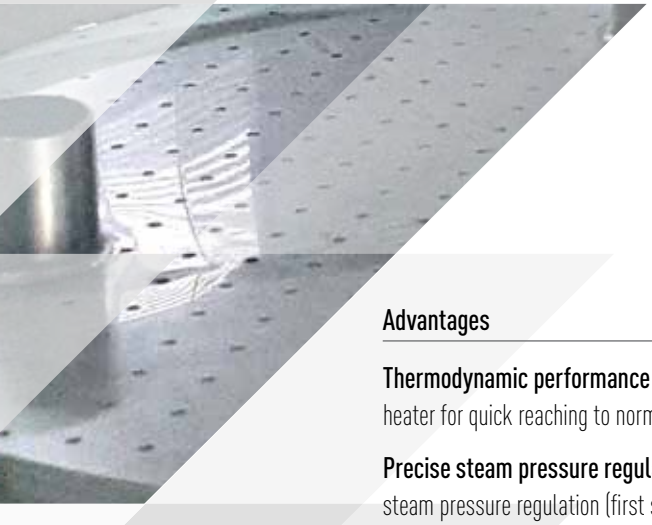
Easy connection to the system thanks to flue gas and air inlet connections.

Deaerator
Thermic

Key Features

Type	Thermal
Material	Carbon Steel or Stainless Steel
Capacity	up to 100 t/h
Pressure	0,2 ~ 0,3 bar_g
Efficiency [1]	< 5 - 12 ppb
Design Life	30 years

[1] *Dissolved Oxigen*



Deaerators are used to remove the dissolved gases from the feed water for steam boilers by thermal method.

The dissolved gases normally present in water cause many corrosion problems. For instance, oxygen in water produces pitting that is particularly severe because of its localized nature. Carbon dioxide corrosion is frequently encountered in condensate systems and less commonly in water distribution systems. Water containing ammonia, particularly in the presence of oxygen, readily attacks copper and copper-bearing alloys. The resulting corrosion leads to deposits on boiler heat transfer surfaces and reduces efficiency and reliability.

In order to meet industrial standards for both oxygen content and the allowable metal oxide levels in feedwater, nearly complete oxygen removal is required. This can be accomplished only by efficient mechanical deaeration supplemented by an effective and properly controlled chemical oxygen scavenger.

In deaerators, the dearator tower has trays which are stacked on top of each other, dividing the make-up water into particles, which are heating up with steam and release the dissolved gases.

Advantages

Thermodynamic performance is achieved by storage tank heater for quick reaching to normal working conditions.

Precise steam pressure regulation thanks to two-stage steam pressure regulation (first step self-actuating and second step pneumatic actuated modulating control valve) to control the steam pressure precisely against capacity change and make-up water temperature and pressure fluctuations.

Deaerator operation on the ground is provided by the use of low NPSH feed water pumps.

Feed Water Pump dry run protection thanks to multible storage tank water level setting opportunity.

Electric and Automation Systems

Automation Systems are used to control all installations according to the working algorithms and keep the installation in safe condition respecting the setpoints.

According to comply with the safe, reliable, durable, and autonomous working requirements of modern industry; the installation must be equipped with an automation Systems.

The in-house designed and manufactured PLC-based automation systems deliver those requirements in a flexible way. Also, PLC-based automation Systems precisely adapt to fluctuation or changed conditions such as pressure, temperature, flow rate, etc.

Controlling the system by PLC provides remote access opportunity via the internet to follow the healthiness of the system and technical support by the manufacturer.

SCADA systems can be installed by integrating with auxiliary facilities. **SCADA** systems can result in significant savings of time and money. Numerous case studies have been proved the benefits and savings of using MNK **SCADA** software solution.

Key Features

PLC Brand	Siemens, ABB, Schneider
Redundancy	On demand
EMC	Fully applied
Human safety	RCCB / Isolation transformer[1)]
SCADA	WinCC

[1)] *it depends on the application*

Advantages

Safe operation is an essential requirement. Thanks to installed SIL2 level instruments

Reliable operation is achieved with World Class components combination. Redundancy is an option to increase the reliability to the highest level.

Documentation is important to understand and maintain the system.

User Access is achieved by delivering backup software programmed with licensed software.

MNK's aftersale support helps the user to operate their system at max. availability

Heat Pump
For Steam and Large Scale

Key Features

ORC Working Fluid	Neo-Pentane/Cyclo-Pentane
Capacity	up to 20MWt
Water Source	from 45 to 120°C
Gas Temperature	<150°C
COP [1)]	up to 10
Design Life	30 years

[1)] *depends on waste heat and steam temperature*

Heat pumps are an energy cycle that converts useless waste heat into useful heat by adding electrical energy.

Heat pumps use the Carnot Energy Cycle. While low temperature packaged units are produced for domestic usage, MNK produces large-scale industrial heat pumps.

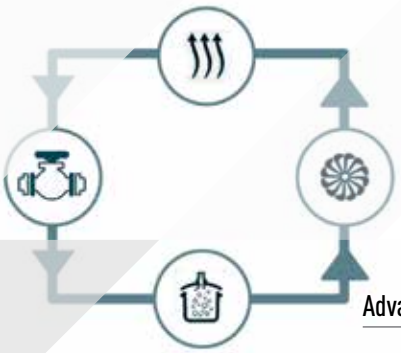
It is possible to produce steam with pentane gases which can reach high temperatures when compressed by using the compressors which is operating reverse of ORC expanders.

It can reach very high COP levels according to the temperature of the water obtained from the waste heat and the steam pressure desired to be produced.

Application Examples

By recovering biomass or coal fired boiler's high corrosion waste gases, deaerator steam can be produced.

Low pressure steam can be obtained with gas engine jacket water.



Advantages

High Performance can achieves with Carnot Cycle.

Long life is ensured by operating low speed compressor and corrosion free organic working medium

High heat recovery by thermoplastic, stainless steel fintube and cross-flow desing

CO_2 Emission reduction, thanks to the conversion of useless heat into useful heat.

Fast return on investment, with high COP rate

Easy to oparate without the need for additional personnel with its high level of automation

ORC
Waste Heat to Power

ORC (Organic Rankine Cycle) used to produce electricity from waste heat sources.

ORC is an energy cycle in which power is produced by using organic fluid instead of water-steam used in the known Rankine Cycle.

ORC systems are widely used to produce electricity from low-temperature heat sources with high efficiency. Due to this valuable capability of the technology created opportunities for the different processes such as landfill gas engine exhaust, glass industry, steel plants, biomass incinerators, etc. to convert useless waste heat to electricity which is a valuable energy form.

Reliable, safe, flexible and high efficient system provides easy operation. The system converts waste heat to electricity with low operation cost, low maintenance requirement, low supervision need between full load and low load (20%) with high efficiency (up to 25%)

ORC can be operate directly into heat source or harvest waste heat from multiple sources via Thermal Oil Circuit.

Key Features

ORC Working Fluid	Neo-Pentane/Cyclo-Pentane
Capacity	up to 20MWe
Gas Temperature	<1.700°C
Efficiency [1)]	Up to 25%
Design Life	30 years

[1)] *Produced electricity / Supplied heat*

Advantages

High Cycle Efficiency can achieves compared to classical Rankine Cycle.

Long life is ensured by operating low speed expander and corrosion free organic working medium.

High heat recovery by fintube and cross-flow desing

Long thermal oil life by precise heat flux calculation and flow control on the system respecting with thermal oil film and bulk temperature limites

A closed system design provides high equipment and workplace safety with a nitrogen blanket in the closed tanks. This also provides pressurize the system and eliminates thermal oil volatile fumes occurrence and circulation pump cavitation risk

No need water that eliminates the corrosion and scaling risks that comes from water. Also eliminates using of chemical consumables, make-up water, and its treatment operation costs.

Manufacturing Capability

All welding fit-ups are made by special-purpose apparatus.

Welding is one of the main processes in the production of boilers.

MNK makes all WPQRs under the supervision of independent organizations according to materials, methods and positions. Production is performed with WPSs prepared according to these WPQRs.

All welding methods such as, SAW, MIG, TIG, SMAW are produced according to these WPSs with the highest quality.

Weld Preparation

Welding preparation is very important as the welding itself. Improperly weld preparations, improperly welding gaps, misalignments lead to poor welding results.

At MNK, all welding preparations are made by machining methods.

All welding fit-ups are made by special-purpose apparatus.

Orbital Welding

With semi-automatic orbital welding, perfect welds that do not allow human error in tube-to-tubesheet welding are obtained at high quality in many different positions.

Painting

Painting is the most common method used to protect against corrosion. A well-painted equipment is vital to improving the quality and visuality of your product.

MNK performs 20 years of guaranteed paint applications with its own equipment up to C5 and C5-M environmental conditions defined in ISO 12944.

Air-conditioned paint booths provide the necessary conditions for curing of paints.

Sand-Blasting

Sand-blasting is very important in surface treatments with paint protection. It directly affects the quality of the paint and the corrosion resistance of the equipment.

MNK is capable to make sand-blasting up to SA-3 quality according to ISO 8501 with its own equipment and sand-blasting booth.

Documentation
Certification

All NDE personnel are certified according to international standards&codes. All records are archived in conditioned rooms for 10 years.

ISO 9001 / ISO 3834-2 / HP-0 Certification

MNK is certified with ISO 9001 - Quality Management System in all processes from material identification to after-sales documentation for obtaining strong customer satisfaction with the process approach and continual improvement.

MNK is also certified with ISO 3834-2 and HP-0 which is a standard based on ISO 9001, specifically tailored for industry related to the quality requirements for fusion welding of metallic materials and related services.

MNK supplies inspection documents supplied to the purchaser, in accordance with the requirements of the order, for the delivery of all metallic products.

According to PED 2014/68/EU and other relevant international standards&codes, inspection documents is supplied.

MNK supplies the 3.1 or 3.2 product certificates according to EN 10204 for European Customers which is issued by the Manufacturer.

Traceability

One of the most important aspects of certification is traceability. MNK has established a traceability system according to the heat number, order and certificate numbers for all materials used in the pressure parts as required by the standards. MNK transfers permanent hard stamps on the materials and keep the records for 10 years...


UKS ULUSLARARASI KALİTE SİSTEMLERİ VE BELGELENDİRME LTD. ŞTİ.

This is to certify

MNK Enerji Kazan Sistemleri Makina San.Ve Tic.Ltd Sti.

Center: Gorukle Mh. Universite 1.Cadde Ulutek Tekno Gel Bol. Sit.A.B.C.D.E.F.H. Blok Apt. No:933/317 Nilufer/BURSA
Factory: Kayapa Mh. Orkide (530) Cd. No:12/1 Nilufer/BURSA
TURKEY

Has been assessed by UKS and found to be in compliance with the following standard

TS EN ISO 9001:2015

The Quality Management System is applicable to;

Energy Boiler Systems Manufacturing and Sales


TÜV NORD

CERTIFICATE

TÜV Teknik Kontrol ve Belgelendirme A.Ş.

Quality requirements for fusion welding of metallic materials

EN ISO 3834-2


ЕВРАЗИЙСКИЙ ЭКОНОМИЧЕСКИЙ СОЮЗ

СЕРТИФИКАТ СООТВЕТСТВИЯ

EAC


TÜV NORD

CERTIFICATE

TÜV Teknik Kontrol ve Belgelendirme A.Ş.

General principles of design, manufacture and associated tests

AD 2000 HP0

NDE – Non-Destructive Examination

MNK applies Non-Destructive Examinations in boiler manufacturing, fabrication to ensure product integrity and reliability, to control manufacturing processes and to maintain a uniform quality level.

The six most frequently used test methods are MT, PT, RT, UT, and VT.

Tests such as PT, UT, VT are performed by MNK's expert personnel and subcontractors are used for RT and MT tests.

CERTIFICAZIONE DI PRODOTTO BUREAU VERITAS Certification

CERTIFICATO N.00/000.

References

Брестэнерго
РЕСПУБЛИКАНСКОЕ УНИТАРНОЕ ПРЕДПРИЯТИЕ

POLMAR
Automotive Plastics
www.polmar.com.tr

armacell

LEDERTECH Deutschland GmbH

sütaş

nuh
yapı ürünleri a.ş.

PETROGAS
GAS SYSTEMS

ŞİŞECAM

BORÇELİK

Vibracoustic

modern

modern enerji

Tarım Kredi Yem

SANAYİ VE TİC. A.Ş.

Cargill™

ORTADOĞU ENERJİ

MNK Enerji Kazan Sistemleri ve Makine San. Tic. Ltd. Şti.

Kayapa OSB Orkide Cad. No:12/1 Nilüfer / Bursa TÜRKİYE
P: +90 (224) 411 00 74 G: +90 (531) 783 24 15
info@mnkenerji.com www.mnkenerji.com