



AKADEMi
METALURJi



Akademi Metalurji is one of the leading companies in the Steel and Heat Treatment industry, distinguished by its strong corporate culture, advanced technological infrastructure, and commitment to quality.

Founded in July 1999 as Akademi Isıl İşlem San. Tic. Ltd. Şti., the company initially started its operations with salt bath heat treatment services. In 2001, it continued its activities under the name Akademi Metalurji San. ve Tic. Ltd. Şti., expanding both its service scope and technological capabilities.

In 2006, Akademi Metalurji realized its first major investment by establishing a new facility and expanding its infrastructure with:

- Vertical vacuum hardening furnaces
- Computer-controlled gas nitriding furnaces
- A fully equipped hardness and metallography laboratory

By 2010, the company achieved ISO 9001:2008 and OHSAS 18001 certifications, reinforcing its commitment to quality, occupational health, and safety. In April 2012, the Gebze Facility became fully operational.

Continuing its investment in advanced technologies, Akademi Metalurji commissioned:

- ALD vacuum hardening furnaces
- ALD vacuum tempering furnaces
- NAKAL computer-controlled gas nitriding furnaces

In 2014, in cooperation with ALD Vacuum Technologies GmbH, the company introduced Low Pressure Carburizing (LPC) and oil quenching under vacuum conditions into its production capabilities.

In 2023, the Beylikdüzü Steel Service Center was commissioned as part of our growth and expansion strategy, resulting in a 100% increase in our steel sales service capacity. This strategic investment significantly strengthened our market presence, particularly in plastic mold steels and engineering steels, enabling us to respond to customer demands with greater speed, flexibility, and added value.

To provide more comprehensive solutions to its business partners, Akademi Metalurji expanded into the supply of tool steels in 2015. From 2020 onwards, the company further strengthened its organization with experienced management and technical teams, enabling the supply of high-standard and premium-grade tool steels.

In 2021, Akademi Metalurji signed an exclusive agreement with OYAL METAL ÇELİK SAN. ve TİC. LTD. ŞTİ., the Türkiye distributor of Metal Ravne d.o.o., granting exclusive sales rights in Türkiye for SITHERM S361R Hot Work Tool Steel.

OUR MISSION

To deliver high-performance materials and heat treatment solutions that meet the demanding requirements of cold work, hot work, forging, extrusion, metal injection molding, and forming applications.

OUR VISION

To continuously improve our technological infrastructure, follow global advancements in metallurgy, and provide high-quality products and services to our valued business partners at the right time, ensuring long-term satisfaction and trust.

HOT WORK TOOL STEELS

Hot Work Tool Steels are a group of materials used in the manufacturing of metal products that require forming at high temperatures, such as aluminum, copper, zinc, lead, brass, zamak, and steel, as well as certain special plastic injection products.

Thanks to specially designed alloying elements, these steels are used in:

- Hot forging dies
- Cores and inserts of high-pressure die casting molds
- Metal extrusion dies
- Hot forming dies
- Hot cutting systems

They are also used in certain plastic molds where high strength and long cycle life are critical. Due to demanding working conditions, mold surfaces are exposed to severe temperature fluctuations and mechanical loads. Therefore, hot work tool steels must exhibit high resistance to such harsh conditions.

PROPERTIES OF HOT WORK TOOL STEELS

- Clean and homogeneous microstructure
- High tempering resistance
- Excellent toughness
- High hot wear resistance
- Resistance to plastic deformation
- High resistance to cracking and fracture
- Thermal shock resistance
- Thermal fatigue resistance
- High thermal conductivity

INCREASING PERFORMANCE IN METAL INJECTION, FORGING, AND METAL EXTRUSION DIES: 1.2367

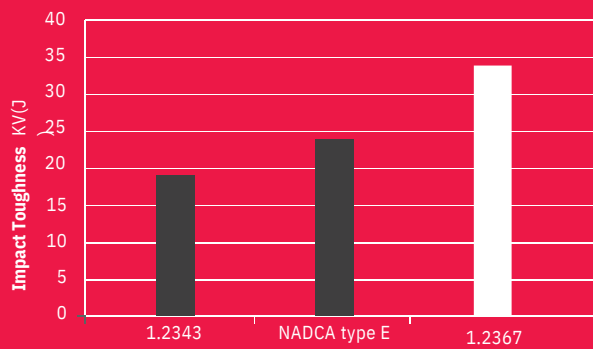
The 1.2367 material from Europe offers outstanding values in many of the properties expected from hot work tool steels and delivers performance exceeding NADCA criteria.

After appropriate heat treatment of hot work tool steels, the following processes can be applied:

- Nitriding
- PVD coating
- Electrical Discharge Machining (EDM)

Please consult technical information regarding the points to be considered before and after these processes.

For delivery conditions and detailed technical information about our steels, please refer to the technical documentation.



Comparison according to NADCA #229

Akademi Metalurji is the sole authorized distributor of 1.2367 Europe in Türkiye.

PRODUCTS	TYPE	C	Si	Mn	Cr	Mo	V	Ni	N	Nb
1.2343	EFS /	0,38	1,10	0,40	5,00	1,30	0,40			
1.2343R	ESR EFS									
1.2344	EFS /	0,39	1,10	0,40	5,20	1,40	0,95			
1.2344R	ESR EFS									
1.2345	EFS /	0,51	0,95	0,30	5,20	1,35	0,90			
1.2345R	ESR EFS									
1.2365	EFS /	0,31	0,30	0,35	2,90	2,80	0,50			
1.2365R	ESR EFS									
1.2367	EFS /	0,38	0,40	0,40	5,00	2,95	0,50			
1.2367R	ESR EFS									
1.2885	EFS /	0,32	0,25	0,30	2,80	2,80	0,50	Co:		
1.2885R	ESR EFS							2,80		

METAL EUROPE – SPECIALLY DEVELOPED STEELS

S350R	ESR EFS	0,36	0,20	0,30	5,00	1,35	0,45			
S361R	ESR EFS	0,36	0,25	0,40	4,90	1,80	0,60	1,65		
S360R	ESR EFS	0,52	0,25	0,30	4,80	3,00	0,60	0,60		
S355R	ESR EFS	0,36	0,30	0,30	5,00	2,3	0,6			
S140R	ESR EFS	0,35	0,05	0,15	Max 0,2	3,5	0,05	2,2		+W

	Work Hardening Resistance	Thermal Shock Resistance	Grain Growth Resistance	Fracture Toughness	Thermal Conductivity
EUROPE 2343R	++	+++	+++	++	+
EUROPE 2344R	++	+++	++++	+++	+
EUROPE 2367R	++	+++	+++	++++	++
EUROPE S350R	++	++++	++++	+++	++
S361R	+++	++++	++++	++++	+++
S360R	++++	++++	+++	++++	+++
S355R	+++	++++	++++	+++	+++
S140R	++			+++	++++

COLD WORK TOOL STEELS

Cold Work Tool Steels are designed for the machining, cutting, and forming of metallic and non-metallic materials. Depending on the application, they offer dimensional stability, high resistance to pressure and wear, and adequate toughness.

Cold Work Tool Steels are used in cold forming operations such as cutting, punching, bending, cold pressing, rolling, and deep drawing.

PROPERTIES OF COLD WORK TOOL STEELS

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- Clean and homogeneous microstructure
- High hardness and hardenability
- Optimum toughness at high hardness levels
- High wear resistance
- High fatigue strength
- Dimensional stability after heat treatment
- Good machinability

WHEN 1.2379 IS NOT SUFFICIENT, FOR HIGHER WEAR RESISTANCE AND TOUGHNESS: SIHARD S460

After appropriate heat treatment of Cold Work Tool Steels, the following processes can be applied:

Nitriding, PVD coating and Electrical Discharge Machining (EDM)

Please consult technical information regarding the points to be

considered before and after these processes.

For delivery conditions and detailed technical information about our steels, please refer to the technical documentation.

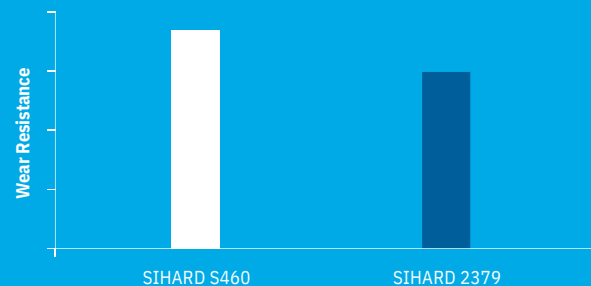


Figure 1: Wear Resistance Comparison

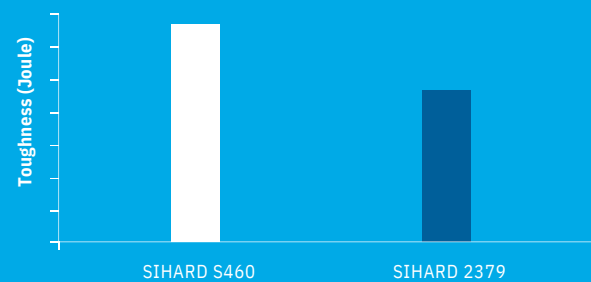


Figure 2: Toughness Comparison



PRODUCTS	C	Si	Mn	Cr	Mo	V	W	Ni	Nb
1.2360	0,47	0,80	0,40	7,50	1,37	1,35			
1.2361	0,90	0,50	0,50	18,00	1,10	0,10			
1.2363	1,00	0,30	0,55	5,20	1,05	0,20			
1.2379	1,55	0,25	0,30	11,50	0,70	1,00			
1.2080	2,05	0,25	0,30	11,50	-	-	-		
1.2767	0,45	0,25	0,30	1,35	0,25	-	-	4,00	
1.2842	0,90	0,25	2,00	0,35	-	0,10			
METAL EUROPE – SPECIALLY DEVELOPED STEELS									
S460	1,00	1,10	0,30	8,00	2,30	0,30			
S470	0,90	0,25	0,40	8,00	1,50	2,10			
S471	1,10	1,00	0,35	7,90	1,50	2,10	1,20		

PLASTIC MOLD STEELS

Plastic Mold Steels are a group of medium- and low-alloy steels used in the forming of many plastic raw materials. They are suitable for the production of a wide variety of products across a broad industrial spectrum.

Thanks to specially designed alloying elements, these steels can be exposed during operation to specific levels of pressure, wear, and even corrosion. In addition to grades specially sulfur-alloyed to improve machinability, there are also grades containing high chromium levels to enhance corrosion resistance.

These steels are used in plastic injection and extrusion processes and play a key role in the manufacturing of many everyday products, particularly in the automotive and home appliances industries.

PROPERTIES OF PLASTIC MOLD STEELS

- Clean and homogeneous microstructure
- Excellent polishability
- Good texturing/etching capability
- Corrosion resistance
- Optimum wear resistance and high strength
- Good hardenability
- High toughness
- Dimensional stability

After appropriate heat treatment, nitriding, PVD coating, and Electrical Discharge Machining (EDM) can be applied to Plastic Mold Steels. Please consult technical information regarding the points to be considered before and after these processes.

For delivery conditions and detailed technical information about our steels, please refer to the technical documentation.



PRODUCTS	C	Si 0,40	Mn 1,50	Cr	Mo	V	Al	Ni -	S
1.2311	0,40	0,40	1,50	1,90	0,20	-	-	-	
1.2312	0,40	0,30	1,40	1,90	0,20	-	-	1,00	0,07
1.2738	0,40	0,40	0,25	1,90	0,20	-	-	0,20	
1.2083	0,35	0,35	0,80	13,00	0,20	-	-	-	
1.2085	0,30	Max.1,00	Max.1,00	15,00	-	-	-	Max.1,00	0,07
1.2316	0,39			16,50	1,05	-	-		

HIGH SPEED STEELS

High Speed Tool Steels (HSS) are special alloy steels containing high levels of chromium, molybdenum, vanadium, tungsten, and cobalt.

They are suitable for both hot and cold working conditions, providing high wear resistance at elevated hardness levels along with adequate toughness. High speed steels can be hardened up to 67 HRC and are capable of maintaining this hardness even at high operating temperatures.

PROPERTIES OF HIGH SPEED TOOL STEELS

- Clean and homogeneous microstructure
- High hardness
- High toughness
- High wear resistance
- Ability to retain hardness at high temperatures
- Dimensional stability

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They can be used in almost all applications where cold work tool steels are employed, as well as in the manufacture of special punches, drill bits, taps, reamers, hobs, and milling cutters, which represent their primary application areas.

For delivery conditions and detailed technical information about our steels, please refer to the technical documentation.



DIN no.	AISI	C	Si	Mn	Cr	Mo	V	W	Co
1.3243	M35	0,93			4,00	5,00	1,90	6,20	4,80
1.3247	M42	1,10			4,00	9,50	1,10	1,50	8,00
1.3302	T15-No Co	1,25			4,00	0,80	3,60	12,00	
1.3342	M2-High C	1,00			4,00	5,00	1,80	6,20	
1.3343	M2	0,90			4,00	5,00	1,80	6,20	
1.3344	M3-2	1,20			4,00	5,00	3,00	6,20	
1.3355	T1	0,78			4,00		1,10	18,00	

POWDER METALLURGY (PM) STEELS

Powder Metallurgy (PM) Tool Steels are tool steels produced by the powder metallurgy process for cutting and forming dies and are mainly characterized by the following features:

- Homogeneous structure
- Uniform and statistically random carbide distribution
- Toughness properties optimized in the rolling and/or forging load direction
- Optimized balance between toughness and wear resistance

ADVANTAGES FOR THE USER

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These features provide the following benefits to users:

- Increased operational and process reliability
- Higher resistance to cracking and fracture
- Improved die performance
- Reduced cost per produced part
- Enhanced dimensional stability during heat treatment compared to conventional steels
- Easier grinding compared to conventionally produced steels with similar alloy content



Material	DIN no.	C	Cr	Mo	V	W -	Co
APM 4	-	1,4	3,7	3,5	3,7	1	-
APM 5	-	1,15	7,5	1,6	2,4	-	-
APM 10	-	2,4	-	1,3	9,7	6,2	-
APM 23	1.3391	1,28	4	5	3	6,4	-
APM 30	1.3393	1,3	4,2	5	3,1	6,5	8,5
APM 60	1.3392	2,3	4,2	7	6,5	-	10,5
APM A11	1.2397	2,45	5,2	1,1	9,75	5,6	-
APM M4	1.3395	1,4	4,2	5	4	12	-
APM T15	1.3394	1,55	4	-	5		5

SPECIAL STEELS

Special Steels are materials that require high technology, high performance, and advanced expertise. While they are used across a wide range of industries, their primary application areas are the aerospace and oil & gas industries.

These materials are characterized by specialized know-how. In steel production, melting is carried out in electric arc furnaces, followed by rolling or forging to produce high-quality long steel products. For demanding service conditions, advanced refining methods such as VOD (Vacuum Oxygen Decarburization) and ESR (Electroslag Remelting) are applied. After forging and rolling, the steels can be produced in a wide range of sizes through heat treatment and machining processes.

Although Special Steels are used in many different applications, their main fields of use are the aerospace and oil & gas industries.

AEROSPACE INDUSTRY

The aerospace industry is a highly demanding sector in terms of quality control and continuous innovation. This high-technology industry requires high-performance materials that deliver exceptional performance and maximum safety at all times.

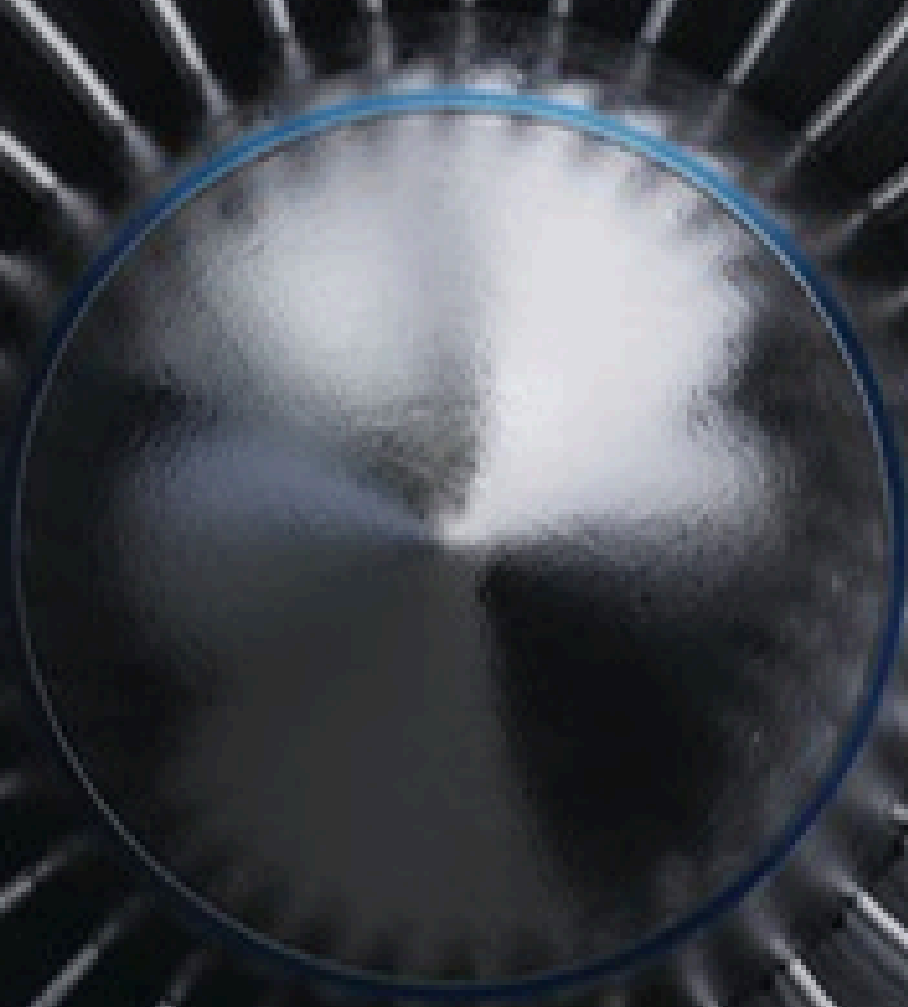
OIL & GAS INDUSTRY

The oil and gas industry is a high-technology sector involving high value-added products that require extensive expertise and specialized content.

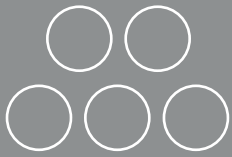
EXPECTED PROPERTIES

- Corrosion resistance
- High temperature strength

For further information, please consult our staff.



STEEL SERVICE CENTER



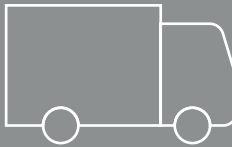
STOCK & CUTTING

Materials in grades suitable for your applications are kept in optimum stock levels and cut to your required dimensions using our continuously upgraded saw park, ensuring delivery at the most appropriate time.



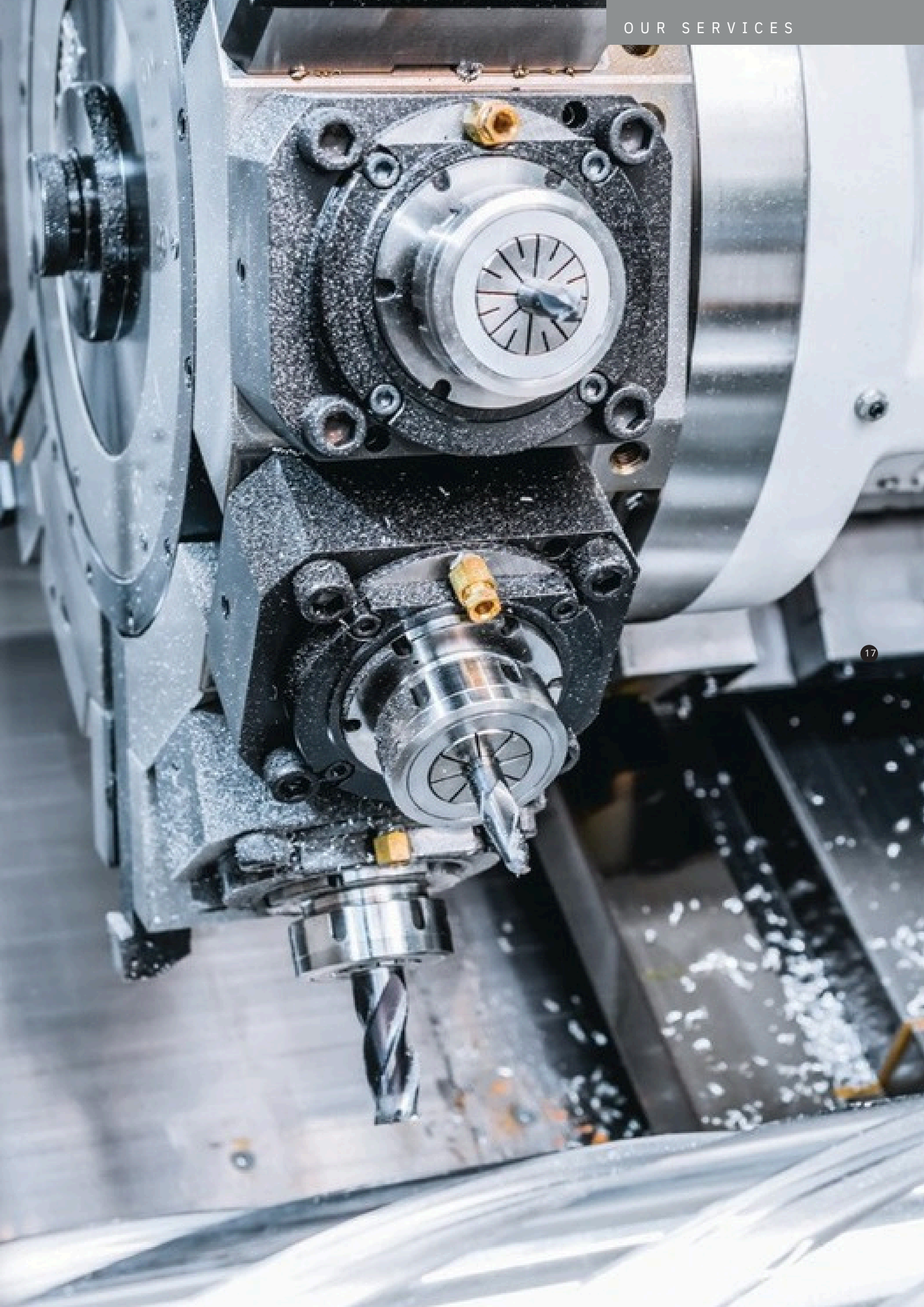
MACHINING

Upon request, we can supply your orders to our business partners as rough-machined or fully machined parts. For details, please contact your sales representative.



LOGISTICS

With its established logistics network, Akademi Metalurji ensures the timely delivery of materials from our steel and heat treatment units directly to you.



HEAT TREATMENT

VACUUM HARDENING

The following processes are carried out in computer-controlled vertical and horizontal vacuum furnaces:

- Vacuum hardening
- Vacuum stress relieving
- Vacuum normalizing

For metal injection molds, NADCA criteria are taken as the reference standard.

Our furnaces ensure excellent temperature uniformity through convection heating and minimize distortion by means of controlled cooling. All processes are fully computer-controlled, allowing full traceability and continuous reporting. The recording system ensures process stability and repeatability for your specific applications.

Note: In our vertical vacuum furnace, long parts can be hardened with minimal distortion. For further details, please contact our technical team.

VACUUM CARBURIZING

ADVANTAGES OF LOW PRESSURE VACUUM CARBURIZING COMPARED TO OTHER METHODS:

- Short process times due to the high carbon concentration of acetylene gas and the patented DualTherm® process
- No surface oxidation, which is common in conventional gas carburizing processes, resulting in higher fatigue strength
- Homogeneous carburized case depth

VACUUM OIL QUENCHING

Vacuum oil quenching is performed in fully computer-controlled ALD DualTherm® vacuum furnaces, completely preventing surface oxidation and decarburization.

The furnace is equipped with nitrogen-atmosphere convection heating to ensure temperature uniformity.

In addition, the Dynamic Quenching® method developed by ALD allows full control of cooling parameters, achieving high mechanical strength with significantly reduced distortion.

STRESS RELIEVING

This process is used to reduce internal stresses remaining in parts as a result of welding, forming, machining, and similar operations. It is also applied to eliminate internal stresses generated during hardening processes.

Depending on your requirements, our furnaces of various sizes are available for this treatment.

Akademi Metalurji performs all stress relieving processes meticulously in computer-controlled furnaces.

NORMALIZING

This method involves heating materials to their austenitizing temperatures to complete the necessary structural transformations, followed by sufficiently slow cooling to restore the material to its natural structure at room temperature.

This service is provided in our furnaces of various sizes according to customer requirements.



GAS NITRIDING

Nitriding is a thermochemical surface treatment applied at low temperatures. In addition to increasing the wear resistance of materials, the nitriding process also improves certain mechanical properties.

Akademi Metalurji provides nitriding services to its customers using computer-controlled furnaces. With precise control of the nitriding potential, the desired layer properties can be achieved accurately.

The advantages of our nitriding services include:

- Low distortion
- Reliable and repeatable processes
- Optional white-layer-free process
- Reduced process times
- Homogeneous nitrided layer independent of component geometry

In our vertical furnace, long parts can be nitrided with minimal deformation. For further details, please contact our technical team.

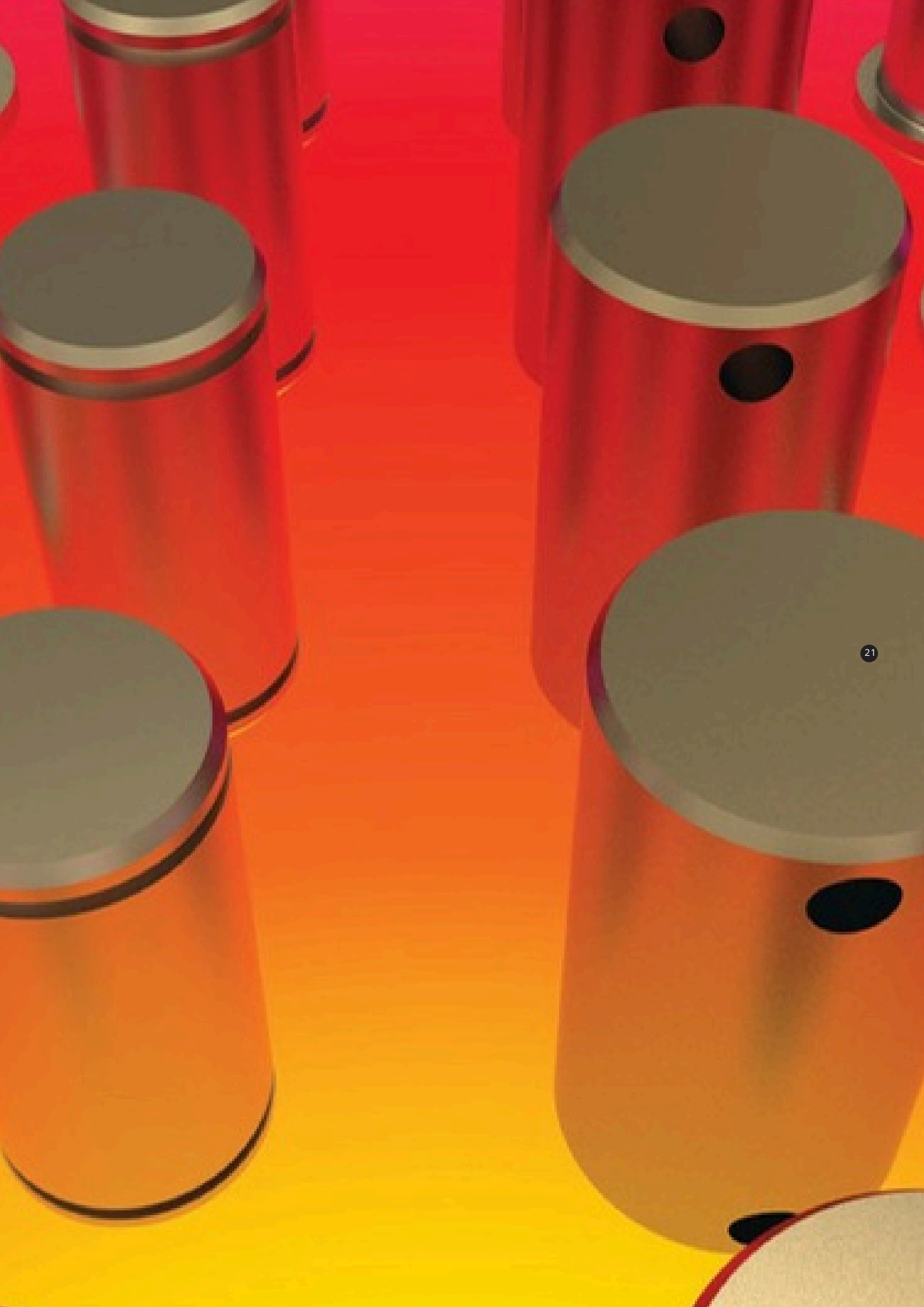
SPECIAL PROCESSES

We provide consulting and processing services through our competent technical teams for special heat treatment processes required by your applications.

ENGINEERING SERVICES

In addition to the supply, machining, and heat treatment of high-quality tool steels, our experienced and specialized technical teams offer the following services:

- Selection of suitable material grades and hardness levels for your applications
- Identification of root causes of mold failures and recommendations to improve performance
- Failure analysis and technical recommendations in our modern laboratory
- Recommendations for performance enhancement and/or repair operations on molds, including:
 - Nitriding
 - Oxidation
 - PVD coating
 - Sub-zero (cryogenic) treatment
 - Electrical Discharge Machining (EDM)
 - Welding
 - Etc.









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