

INNOVATION.
SLITTING TECH
AND VALVES.
PRECISION.



ALUMINIUM PRODUCTION

REQUIRES PROFESSIONALS. SLITTING TOO.



| ALUMINIUM . PAPER . LABEL . TAPE . FILM/FOIL . NONFERROUS METALS . STEEL . OEM |

» AUTOMATIC SLITTING SYSTEMS . DIENES QUALITY: ALUMINIUM

ABOUT THE ART OF PRODUCTION AND PROCESSING



2

After oxygen and silicon aluminium is the most common element in the earth's crust and thus a component of nearly all sand and gravel. Nonetheless, it numbers among the most recently developed industrial metals.

First discovered in 1825 by the Danish researcher H. C. Oersted during the decomposition of aluminous earth and, in 1827, produced by Friedrich Wöhler as pure aluminium by reduction of aluminium chloride with calcium, its production on an industrial scale began much later than other metals.

It is no longer possible to imagine any area of technology or daily life without aluminium.

Counted among the lighter-weight metals due to its low density, aluminium, with its high strength and resistance to corrosion, has led to a large number of high-value products perfectly adapted to their respective areas of use.

Production and processing requires quality work. Even when slitting aluminium one must understand much more than just width and thickness of the material.

The numerous patents held by DIENES and their use worldwide did not come solely from the ambition to manufacture the highest quality cutting systems. Intensive research has resulted in a firm understanding of many different types of aluminium during the slitting process.

And not to be forgotten are the results of many joint problem solving conversations with customers in the aluminium processing industry.

This has definitely played a role in making DIENES the international leader in providing slitting systems with precision, reliability, long life and short setup time.

DIENES quality, precisely.



DIN EN ISO 9001 Rev. 2000



DIENES | The World of Knives the World over

Aluminium, Essen | Euroblech, Hannover | Fabtech, USA | Industria, Budapest | IMTS, Chicago | Taropack, Posen | Pack Expo, Chicago | CMM, USA | Exfor, Montreal | Embax, Brünn | MiAC, Italy | Interpack, Düsseldorf

ABOUT THE ART OF SLITTING

Each aluminium product may demand different slitting requirements according to the application.

- For roll-cutting machines
- For doubling machines
- For trimming systems
- For precision strip slitting lines

- For separating machines
- For cross-cutting machines
- For roll stands

A–B

- ▼
- Adhesive foils
- Aluminium alloys
- Aluminium bands
- Aluminium cans
- Aluminium cans for food
- Aluminium coils
- Aluminium composite foils
- Aluminium containers
- Aluminium embossed foil
- Aluminium foils, lacquered
- Aluminium foils, laminated
- Aluminium foils, net
- Aluminium foils, printed
- Aluminium hard foils
- Aluminium ornamental hub caps
- Aluminium, PE coated
- Aluminium seals
- Aluminium sheets
- Aluminium soft foils
- Aluminium strips
- Aluminium-vapour-coated foils
- Automotive fins
-
- Bands
- Beverage cans
- Beverage packaging
- Blank aluminium
- Blinds
- Blister foils
- Bottle caps
- Bottle neck foils
- Butter packaging

C–K

- ▼
- Cables
- Cable bands
- Cable foils
- Can end stock
- Can stock
- Cans
- Caps
- Chocolate packaging
- Chocolate wrappers
- Cigarette packages
- Cigarette packaging
- Composite foils
- Condensers
- Container stock
- Cooling lamellas
- Copper band
- Covering foils
- Cream can applicator
-
- Embossed foils
-
- Fin stock
- Flattened wires
- Flexible tube bands
- Foils
- Foil bags
- Foil labels
- Food cans
- Food packaging
- Functional foils
-
- Household foils
-
- Insulating foils
- Insulating materials
-
- Jacketing

L–Z

- ▼
- Lamellas
- Laminate tubes
- Lithoaluminium
- Lithography foils
-
- Membrane foils
- Multi-layer foils
-
- Packaging
- Packaging sheets
- Pharmaceutical cap band foils
- Plates
- Protective bands
- Protective foils
- Pull-off seals
- Pure aluminium
-
- Reflectors
- Roll stores
-
- Sealing bands
- Sealing strips
- Seamed lid
- Separating layer foils
- Sheets
- Shields
- Sound insulation
- Sound insulation bands
- Strips of all types
- Sunscreen foils
- Sweets packaging
-
- Thin bands
-
- Ornamental parts
- Ornamental strips
-
- Vehicle structural components
-
- Winding bands



In 1913, slitting thin aluminium was a laborious task. The challenge to Karl Rudolf Dienes was to take the problems of the few aluminium producers and processors at that time and develop knives and systems that reduced labour and improved slit quality.

With over 500 employees, the DIENES Group is currently the world's leading provider of precision slitting systems. At the company headquarters alone, located in the vicinity of Cologne, knives and systems are produced on 25,000 m² of floor space.

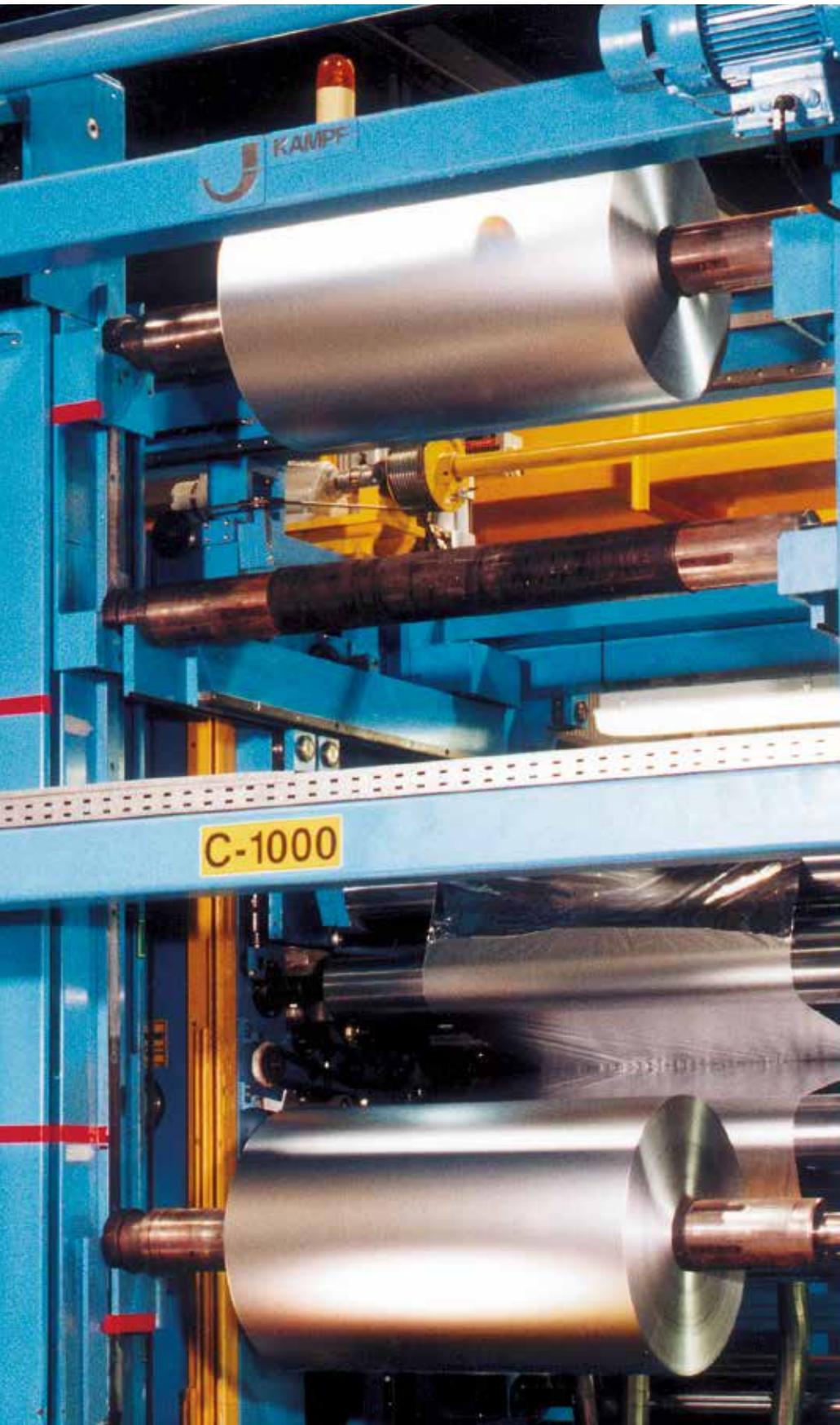
Over 85,000 knives and several hundred knife holders are in stock at all times, so that our customers' emergency needs can be handled immediately.

Our services include a 48-hour turn-around regrinding service performed by trained specialists, as well as our own slitting laboratory in which we test all applications and options for improvement in the interest of our customers.

We offer the following:

- **DIENES Top and Bottom Knives for Sheeters**
Maximum service life | Optimal cutting edge | Minimum dust
- **DIENES Longitudinal Knives, Shearing Knives and Bending Tools**
Refinements to extend the service life and reduce cutting dust
- **DIENES Pneumatic Knife Holders**
Flawless handling | Sensor calibrated | Integrated vibration dampening | Ease of retrofit | Cutting widths starting at 16 mm
- **DIENES Automatic Slitting Systems**
Modular installation for automatic slitting systems | All quality parts can be installed or retrofitted in all types of machines
- **DIENES 48-Hour Service**
Skilled service | CNC/NC precision grinding | Pickup and delivery service
- **DIENES Kaizen Analysis and Slitting Seminars**
Intensive research | Finite Element Method (FEM) analyses | Drastic reduction in costs | Troubleshooting

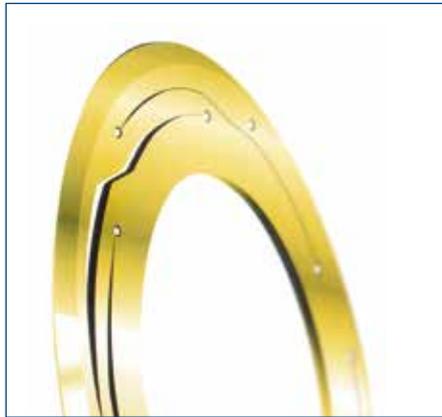
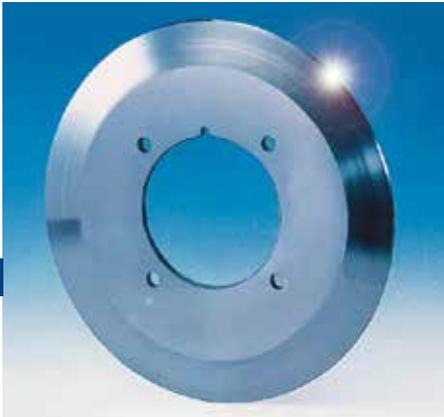




DIENES on Reliability

Every second of machine downtime costs money. In its own slitting laboratory, DIENES applies its expert knowl-edge and extensive research in the intensive testing of all its knives and systems for all applications. This results in longer knife service life and perfect matching to every machine. DIENES quality, precisely.

CIRCULAR KNIVES OF STEEL, REFINED, DPM, CARBIDE AND CERAMIC UP TO Ø 500 MM

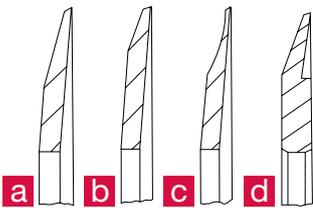


Up to 40 manufacturing operations are necessary for a knife to receive the DIENES seal of quality. Even the slightest tolerance deviation from specification will fail the DIENES stringent quality requirements.

Individualised Special Knives

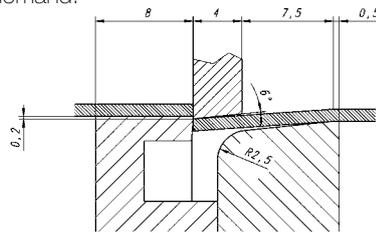
Working with customers worldwide, DIENES technology has been applied to create special slitting systems that are not available as standard products. We gladly accept the slitting challenges your special materials demand.

DIENES can provide both solid and precision split, multi-edged bottom knife blocks. Split knife blocks offer the advantage of extending running periods by moving easily to fresh knife edges and having a quick change-over when re-sharpening is needed. Multi-grooved sleeves for supported razor slitting are also available.



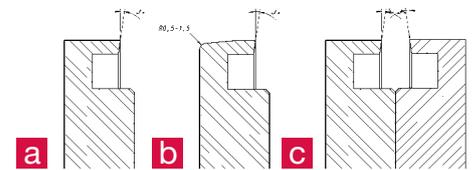
Bevel Cross Sections

- | | |
|--------------------------------|---------------------------------|
| Cutter concave: | Cutter flat: |
| a Tapered bevel | d Available in all types |
| b Special bevel | |
| c Tapered concave bevel | |



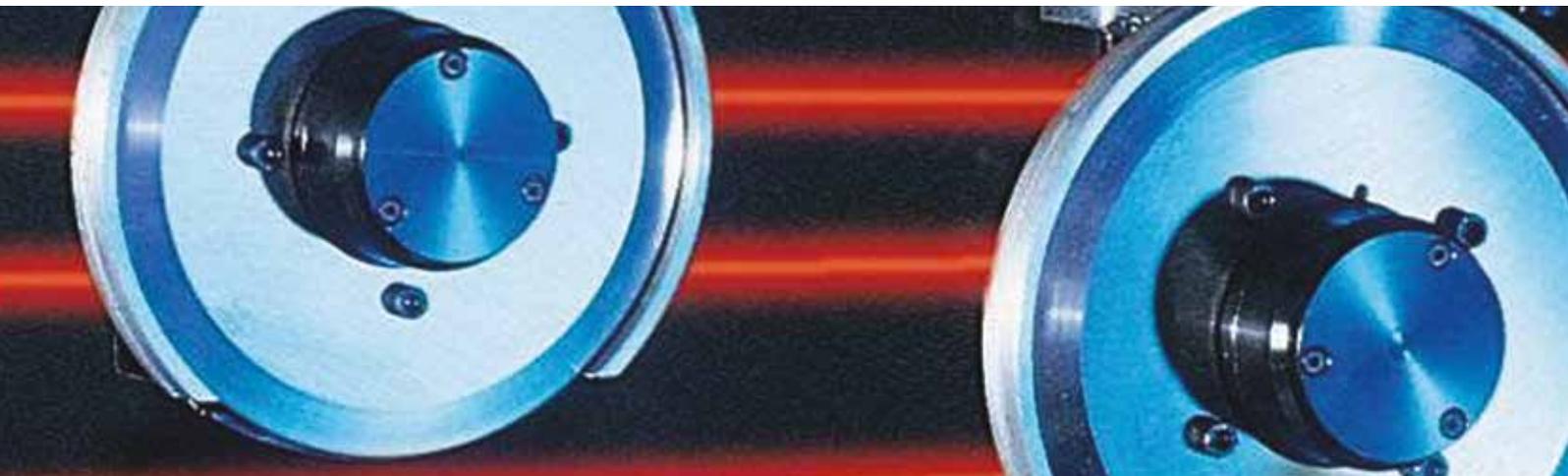
Proven Slitter Arrangement

Shown above is one of the best examples of the benefits realised and available from DIENES' long experience in slitting aluminium materials.



Lower Knife Cross Sections

- a** Standard (assembly, grooving cutter/intermediate rings)
- b** With CNC radius, transition-free (assembly, frame in the block)
- c** Arrangement for check strips



SHEAR KNIVES OF STEEL, REFINED, DPM, CARBIDE AND CERAMIC UP TO 6,000 MM OR Ø 450



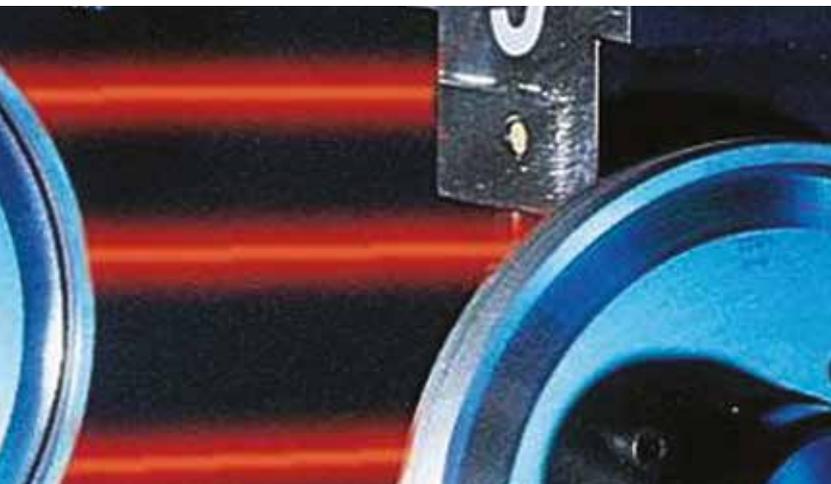
“Longlife” stands for the small but fine distinction in the professional use of shear knives and bending tools. “Longlife” is a technologically unique method for finishing cutting tools. This innovation has significantly reduced cutting dust and increased knife wear resistance.

Cutting strips, roll shearing knives, ejector rings and separating tools adapted exactly to the type of knife must meet the highest demands with regard to the choice of knife material.



To optimise cutting production and minimise set-up time of knife shaft systems, a new computer program is available to DIENES customers. After setting a pre-determined cutting plan, the program accurately defines the proper sequence for mounting cutting tools. The results are cost savings when minimum time is required to assemble tooling and test cuts during set-up are not required.

DIENES Quality Brands:

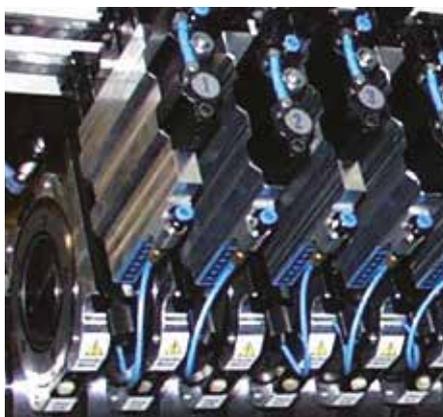


DIENES on Economic Efficiency

DIENES' economic efficiency analyses for large international aluminium manufacturers and processors showed that changing to specially matched DIENES slitting systems extended the knife service life by 10 to 30 times. When one takes into account the longer machine running time, reduced maintenance costs and material savings resulting from fewer malfunctions, investment in the newest technology quickly and clearly makes an impact on the operational bottom line.

PNEUMATIC KNIFE HOLDERS FOR DOUBLERS, SEPARATORS, TRIMMERS, ROLL STANDS, ROLL SLITTERS AND CROSS CUTTERS

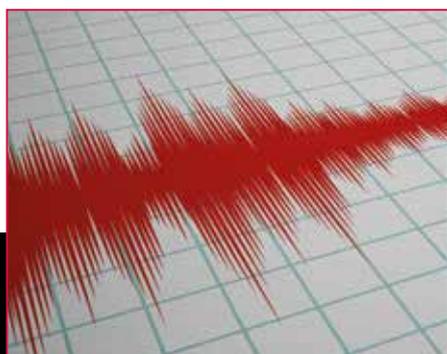
8



The absolutely precise guiding of knives for achieving long service life requires a high degree of know-how in the development and design of knives and their holders.

Independent of the cutting stroke and effects of heat, the DIENES pneumatic knife holders offer precise control of the important geometric slitting relationships needed for properly slit aluminium foils. Zero clearance, pre-loaded, caged linear ball bearings support both vertical and horizontal action of the knife holders.

- 1 Precise setting of knife depth.
- 2 Reliable and exact positioning of the holder with a 360° hand guard.
- 3 The positioning aid is so simple and brilliant that it is protected by patent: the DIENES Knife Pilot Easy Set. Low cost – high precision. The worldwide standard for manual systems.
- 4 A new lubricating system optimises fluid displacement to the top knife blade and increases knife life.



The bearing cage guided knife holder shafts, manufactured to the highest level of precision, do guarantee a torsional free and vibration dampening operation, compared to less complex solutions. This allows the user to experience the DIENES high precision slitting technology to its utmost extent.



AUTOMATIC SLITTING SYSTEMS FOR DOUBLERS, SEPARATORS, TRIMMERS, ROLL STANDS, ROLL SLITTERS AND CROSS CUTTERS



DIENES flexibility in problem solving is also found in the

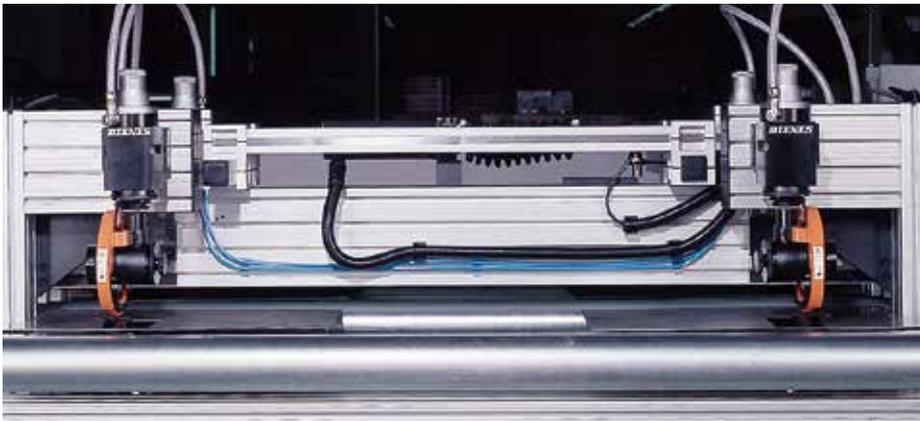
DIENES Modular System

Whether you are using stand alone modular systems, slitting systems to be installed as components in planned OEM machines or systems to be retrofitted in your existing machines, you can simulate the use of complete units on a computer with DIENES system software; available of course with all customary interfaces and bus systems.

An example of a cost-reducing modernisation is a roll cutter with fully automatic positioning of 38 upper and lower knives. The input of new cutting patterns is done from the ERP system. Aluminium bands with a thickness of 0.024 to 0.3 mm are cut with a precision of one tenth of a millimeter.

DIENES Service: Telematic Service

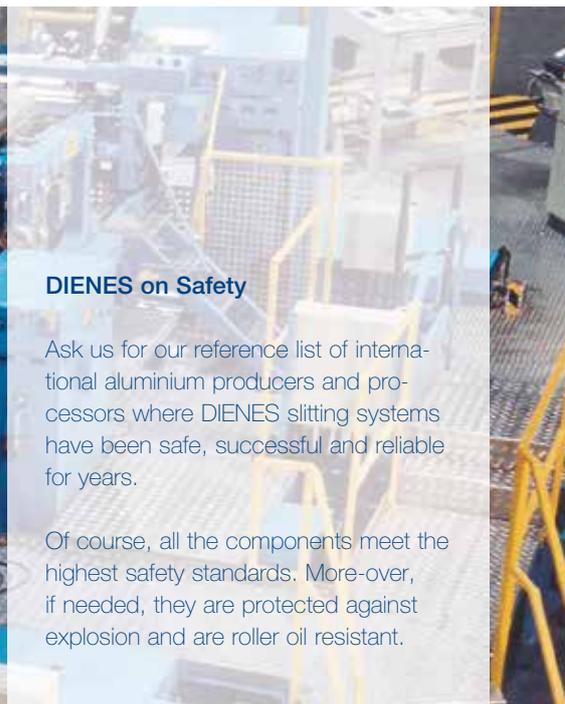
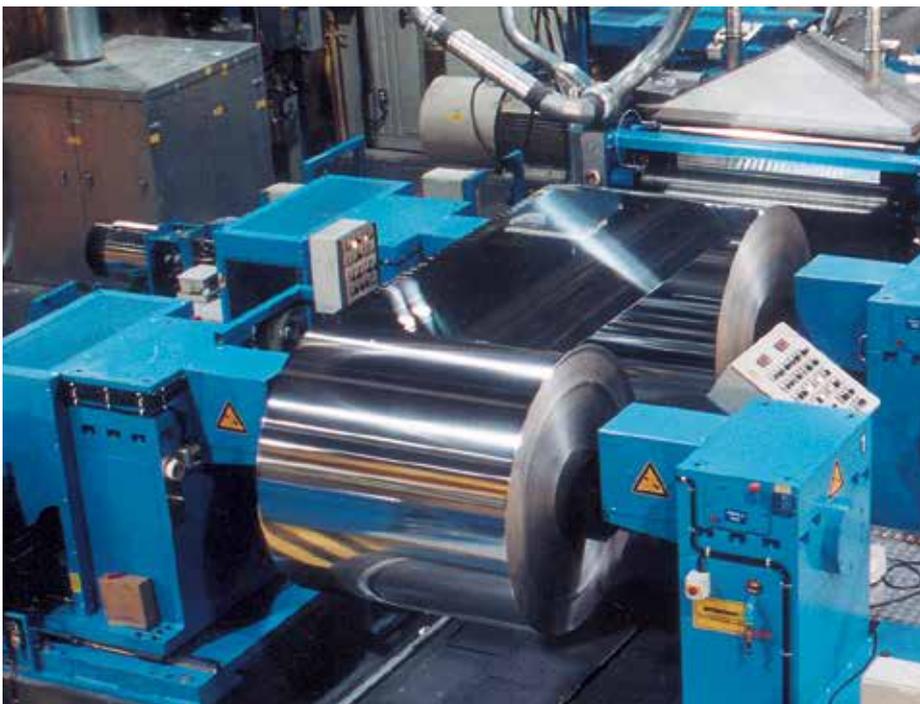
Integrated systems also permit remote maintenance and fault analysis simply via phone modem.



DIENES on Safety

Ask us for our reference list of international aluminium producers and processors where DIENES slitting systems have been safe, successful and reliable for years.

Of course, all the components meet the highest safety standards. More-over, if needed, they are protected against explosion and are roller oil resistant.



DIENES B2B KNIFE MANAGEMENT SYSTEM, KAIZEN ANALYSIS AND REGRIND SERVICE



Even the best knives must eventually be replaced. DIENES has made this operation faster and safer by its well designed replacement system, with optimal protection from injuries.

The 48-hour regrind service, which operates the newest generation of CNC machines, is performed under the same strict quality criteria that you expect from the DIENES Group.

In addition to seminars and in-house training sessions, the regrind service is an important component among the various services provided by DIENES.

Regrinding and polishing machines, which are easy to operate, are offered by DIENES to companies which would like to implement regrinding and polishing in-house.

You get **knife management** support not only through new registration, control and order systems but also through custom knife storage and shipping boxes.

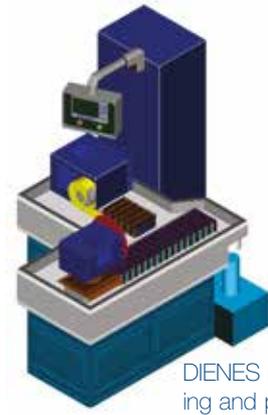
Kaizen analysis has been developed by DIENES for perfect comparative data and sample knife holders give demonstrable improvements in cutting quality, handling, increase in service lifetime and processing safety.



DIENES knife storage cabinet



DIENES shipping box



DIENES regrinding and polishing machine

DIENES B2B Knife Management System

- Inventory and status control
- OPTI-Tool tool calculation
- Optimised knife requirements
- Internet knife display
- Electronic key system
- Installation logistics
- Just-in-time replacement
- Paperless transactions
- Cost control
- Cost reduction

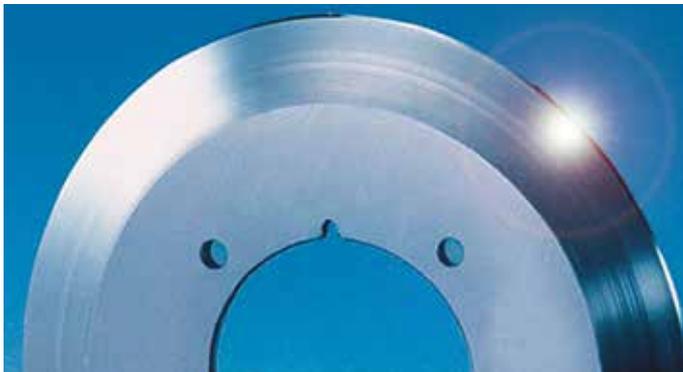
DIENES Kaizen Analysis

- Planned/actual comparisons
- Cutting force
- Knife overlap
- Surface quality
- Regrind quality
- Web entrance/Cant angle
- Knife head torsional play/ Knife head bearing play
- Analysis of cutting edge
- Evaluation
- Troubleshooting

DIENES Regrind Service

- Hotline (optional)
- Pickup
- Cleaning
- Precision measurement
- Group classification
- 2-phase CNC/NC precision grinding
- ADS Anti-dust surface (optional)
- Inspection
- Specifications, test report (optional)
- Shipping

DIENES – WE CAN BE IMITATED, BUT OUR QUALITY CANNOT BE SURPASSED.



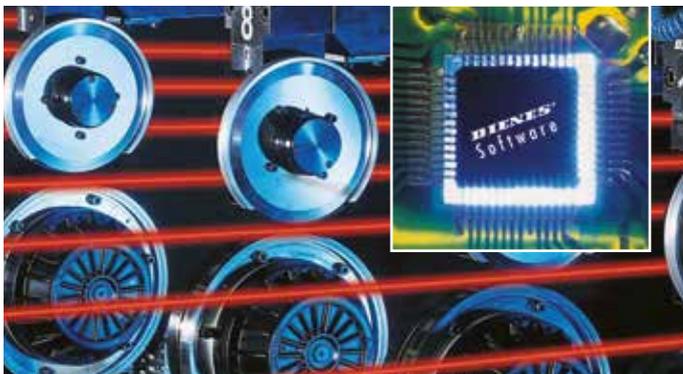
DIENES Knives
Quality means reduced cost.

DIENES knives and holders have become the benchmark for highest quality, optimal service life and minimised dust production.



DIENES Complete Units
The system provider for machine design.

From stepwise automation up to modular units, DIENES offers you slitting know-how based on over 90 years of experience. Many applications that are currently taken for granted in the aluminium industry go back to DIENES patents.



DIENES Automation Technology
Ready-to-use software and systems.

Before the first screw is put in, you see the complete application on your computer screen. Laser-controlled, program-monitored slitting applications have been demonstrated numerous times on the international level.



DIENES Service and Analysis
We are here for you, around the world.

Service must be quick but also qualified. Our service personnel are continuously trained in our own slitting laboratory and are well-acquainted with any given system.

At DIENES, attention to quality does not end after delivery.

| GERMANY . BELGIUM . CHINA . FRANCE . HUNGARY . POLAND . RUSSIA . USA |