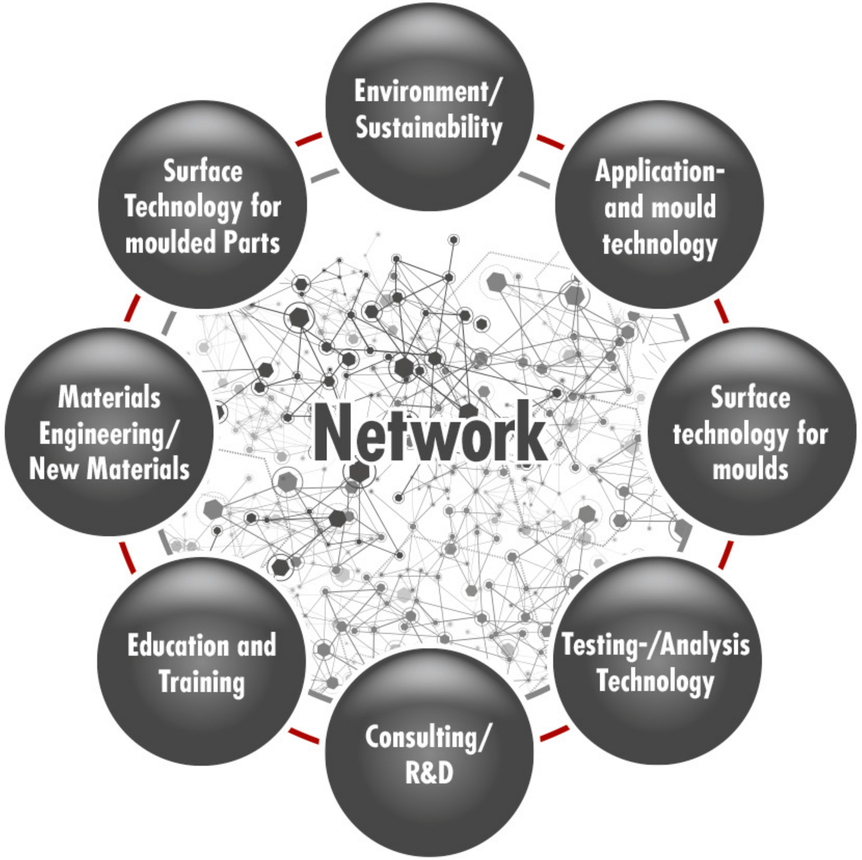

ENGINEERING
Network
research & development
training & counselling
testing & analyzing
joint projects
KUNSTSTOFF
INSTITUT
LÜDENSCHEID

Service overview



The Kunststoff-Institut Lüdenscheid ...

- supports you in selecting, developing, optimising and implementing products, tools and processes in all areas of plastics technology.
- offers in-depth services in adjacent fields of polymer technologies regarding innovation, research and development within its business domains.
- was founded in 1988 as an “extended workbench”, which makes it the most experienced service provider in this sector.
- currently employs around 100 employees.
- generates an annual turnover of around ten million Euros each year

Data & Facts

The Kunststoff-Institut Lüdenscheid unites cutting-edge know-how with the latest production technologies to further boost quality and economic efficiency – particularly focusing on injection-moulded parts made of thermoplastics and thermosets.

The Kunststoff-Institut is also focussed on:

- Exceptional competence, as guaranteed by our qualified and experienced employees as well as stringent quality assurance systems
- Swift and flexible order processing
- Strict practical relevance, which assists user-directed customer support
- Research and technology transfer
- Scientific and Research activities in the plastics processing field and development of plastic materials and plastic products
- Target-group oriented education and training

The company is certified in accordance with DIN EN ISO 9001 and the laboratory is accredited in accordance with DIN EN ISO/IEC 17025. The international proficiency test series is accredited according to DIN EN ISO/IEC 17043:2010.

Environment/Sustainability

Ludger Wüller | Hanna Steffen | phone: +49 2351 1064-177 | -814

In the area of environment and sustainability, the Kunststoff-Institut offers a comprehensive comprehensive value proposition that covers the entire value chain of plastic products. The offer includes solution approaches starting with product design, to energy- and material-efficient, manufacturing processes and recycling. On the basis of our expertise and the interdisciplinary cooperation of all technology areas, we are able to develop individual company-specific solutions and support you in identifying and implementing your existing and future sustainability goals. and future sustainability goals.

We support you in the implementation of your issues in the areas of:

- Design for Recycling
- Material development
- Material selection
- Use of recycled materials
- Development and establishment of material cycles
- Use of biopolymers
- Paper injection molding
- Energy optimization in the process
- Material qualification
- Research and support regarding relevant standards
- CO_2 recognition of product and company
- Application of D4S (Design for Sustainability)/holistic contemplation of sustainability incl. report

Products

Elke Dormann | phone: +49 2351 1064-119

The Kunststoff -Institut offers a range of valuableaids for coping with day-to-day company practice:

- Guidebooks on moulding defects on thermoplastic-injection moulding parts, on the initial setup of injection moulding machines as well as support in management questions and presentation of management topics (as manuals)
- K-Advisor-Touch - Software for the systematic and transparent documentation of mould sampling
- Components for CO_2-temperature control for a targeted mould cooling
- Material and additive databases for FTIR spectroscopy and thermal analysis
- Crack Knacker - test system for the visualization of molding defects and residual stress in the component

- Structure plates - DIN A5 sample plates in various materials with different VDI structure classes
- Contamination Spy - Modified powder for the visualization of invisible, film contamination - e.g. fingerprints or release agents and preservativeson uncoated components
- Aluminum composite bags in various sizes for the safe transport of emission samples

Surface technology for moulded parts

Dominik Malecha | phone: +49 2351 1064-132

The Kunststoff-Institut supports you in selecting, applying and assessing optimal surface-treatment technologies for moulded parts and tools.

Surface technology for moulded parts:

- Selection of surface and decorative techniques together with the introduction of new decorative technologies
- Process developments and optimisations, process combinations
- Symbol and ambient lighting for technical lighting applications
- Global installation assessment and equipment design
- Process optimisation and minimisation of scrapping
- Independent supplier selection
- „Design meets Plastic" – design and technology workshops in the showroom for surface technology

Surface Testing Methods:

- Comprehensive surface testing technology including colour and gloss measurement, contactless roughness and topography measurement, surface energy, scratch and wear resistance, layer thickness measurement (see also test engineering)
- Support in creating test standards
- Research and development

Surface technology for moulded parts (AOT)

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The scope of service of the application centre for Surface technology (AOT) includes:

- Prototypes, initial samples and low-volume production
- Parts coatings and parameter optimisation
- Development, testing and qualification of new systems and process combinations

Existing plant equipment:

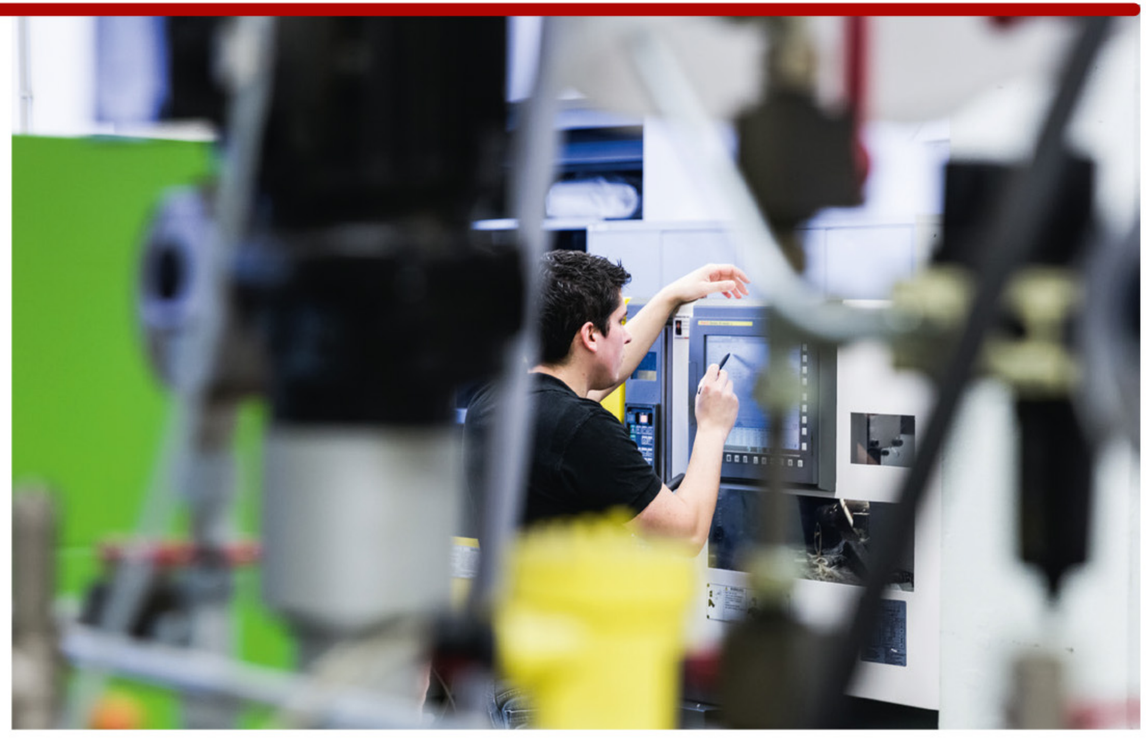
- Laboratory painting machine & semi-enclosed manual painting booth
- InMould Coating (PUR/PUA)
- PVD system (magnetron sputtering)
- UV curing system
- IMD production cell
- Thermoforming unit
- Electrostatic flocking unit
- Water transfer method
- Marking laser, laser cutting system

- UV digital printing, pad printing, screen printing, hot stamping
- Pretreatment by means of corona, flame treatment, AD and LP plasma
- Component cleaning, microblasting
- 3D printer (FDM technology)

Application technology

Andreas Kürten | Christian Kürten | phone: +49 2351 1064-101 | -102

The application technology is due to the excellent technical equipment and the practical experience of the employees is able to support its clients in the following support in the following areas:



- Worldwide process support
- Injection moulding technology
- Methodical process analysis
- Process optimization
- Sampling of injection moulds: injection moulding, injection compression moulding, multi-component injection moulding, thermoplastic foam moulding, back injection and overmoulding of inserts and foils, gas injection
- Practice-oriented employee qualification with the focus on mould and process optimization
- Application-oriented process selection
- Joining technology
- Process development
- Implementation of assembly processes in an injection mould
- Hybrid material combinations (elastomer, thermoplastic, thermoset, glass, metal, etc.).

Mould Technology

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The production and quality-oriented design of moulds and moulded parts is the prerequisite for an economical and reliable production.

The Kunststoff-Institut supports its clients in:

- the development of tool concepts and specifications as well as project support from the concept to series production in Germany and abroad
- evaluating moulded parts and moulding concepts with regard to with regard to criteria suitable for plastics
- Optimization of the moulded part geometry with regard to weld lines, venting, warpage and strength problems
- flow and thermal optimization of moulds with regard to shortest moulds with regard to the shortest possible cycle times by means of simulation technology (filling simulations)
- structural-mechanical component analysis (FEM)
- the optimization of the component design/topology to reduce weight, cycle and thus cost reduction.
- the processes of dynamic tempering technologies
- in the reduction of deposit formation and demolding force
- questions relating to the topic of generative mould toolmaking

The IAF (Innovation Center for Additive Manufacturing Technologies) offers printing of components by means of:

- FFF (up to 300°C melt temperature and continuous fiber possible), SLA (div. photopolymers), DLP (with 405nm, open parametersystems) SLS (PA 11, 12 and TPE)
- Filament production of plastics with up to 400°C melt temperature and 4mm diameter
- Support for 3D printing
- Testing and analysis on printed components according to applicable standards
- Industrial 3D printing
- Long-term behavior of additive components
- Production of prototypes and components in very small series

Surface technology for moulds

Frank Mumme | phone: +49 2351 1064-139

Coatings optimize the wear behavior as well as functional properties of tool surfaces. Enhance the quality of your parts and the productivity of your production processes. We coat your tools; analyze uncoated and coated surfaces and advice you concerning the selection of application-oriented coatings and surface structures.

- surface technology for tools/parts
- application-oriented selection of surface and coating technologies
- low temperature CVD coating technology
- coating of complex geometries (e.g. with undercuts)
- nano structuring of tool surfaces for enhanced demolding and piracy protection
- characterization of the coating:
  - adhesion: scratch test, Rockwell penetration test
  - measurement of coating thickness: SEM, XRF and calotte grinding
  - alloy and coating composition: SEM-EDX, XRF
  - hardness of the coating: micro-/nanoindentation
  - friction coefficient: operational test bed as well as tribometer measurements
  - wear resistance: operational test bed as well as index abrasion measurements
  - corrosion test: current density potential measurements as well as impedance spectroscopy
  - thermal conductivity of thin film coatings: indexed measurements of thermal conductivity
- applicable coating recommendations: dependent on the used polymer and the problem
- surface analysis of tool structures
- 3D measurement technology according to DIN 25178
- research and development in the area of surface technology

Materials engineering/New materials

Thies Falko Pithan | phone: +49 2351 1064-135

The Kunststoff-Institut stands out by its many years of material engineering expertise. A main field of activity apart from expert counselling is industry- and company-specific material development for industrial applications. The interdisciplinary cooperation of the Institute's specialist departments offers the advantage of comprehensive product development facilities. Keywords are: heat management (heat conductivity), flame protection, filler and reinforcement materials, functionality of materials systems, electromagnetic compatibility (EMC), antibacterial materials, tribology, acoustics, recycling, bioplastics.

The Kunststoff-Institut offers you its support in solving your problems in all of these areas:

- application-oriented material development
- evaluation, development and validation of functional materials for industrial solutions

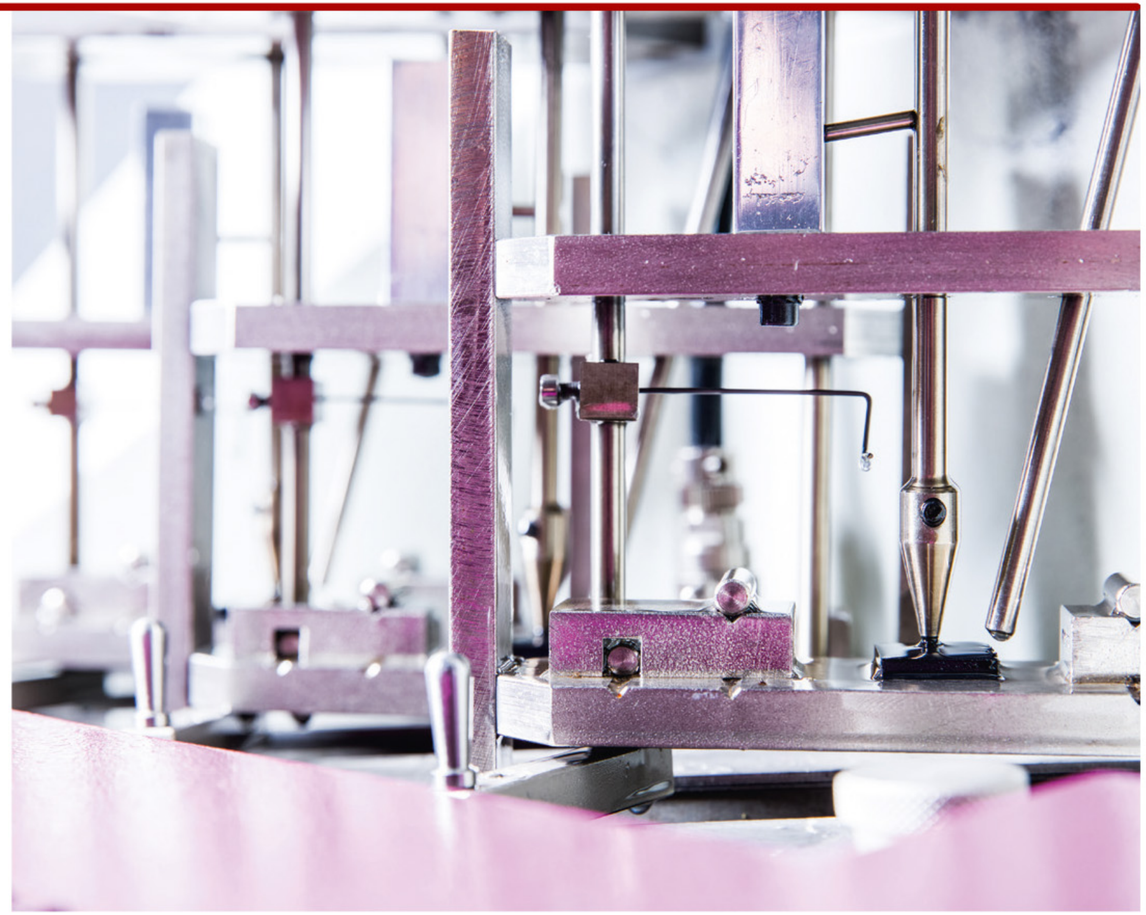
- use of bio-based materials and renewable raw materials
- development and modification of special materials
- material-Upcycling
- introduction of recycling concepts/use of recyclate in plastics processing
- selection of materials based on customer requirements
- minimisation of material types
- resource efficiency
- materials engineering training courses
- joint and development projects

Testing technology

Jens Hündorf | phone: +49 2351 1064-150

The laboratory which is flexibly accredited according to DIN EN ISO/IEC 17025 and approved by numerous automotive OEMs, is fitted with the latest top-class testing equipment for investigating materials and parts:

- Materials testing
- Incoming goods inspections
- Viscosity number, melt flow index MFR/MVR
- Mechanical testing: tensile test, flexural test and impact test
- Density and ash content determination
- Thermal properties: melting point, Vicat softening temperature, HDT measurement, etc.
- Hardness testing: Shore A/D; ball indentation hardness, IRHD hardness
- Media resistance characteristics/heat aging
- Recyclate: quality analysis
- Testing of elastomers
- Aging tests
- Test specimen production/standard test specimens
- Automotive testing (DBL, GM, BMW, Ford, VW-TL...)
- Exposure testing using a xenon tester (DIN EN ISO 105-B06) and sunlight simulation (DIN 75220)
- Environmental cycle test (PV 1200, BMW PR303.6)



- Emission behavior (VW 50180, fogging, odour, etc.)
- Flammbility testing (FMVSS 302, DIN 75200, UL 94)
- Material requirements (DBL 5404, TL 527...)
- Surface testing according to specifications: e.g. TL 226, DBL 7384, DBL 1302, cream-, scratch resistances
- Various OEM approvals

Analysis technology

Dr. Kristina Ehlers | phone: +49 2351 1064-864

Moulded plastic parts may fail for many reasons, but the priority is first to identify the fault and then establish a way of avoiding or solving the problem. When things go wrong, our scope of service not only covers conventional troubleshooting but is also leveraged by more than 30 years of experience in polymer and failure analysis to rework your process and make it secure and efficient once again.

The spectrum of services includes:

- Failure analyses on moulded parts, coatings and assembly units
- Material characterisation, material deformulation, additive analytic
- Visualisation of faults, layer sequences, geometries, non-destructive test methods

We draw on the latest equipment technology available for use in our accredited laboratory:

- Spectroscopy: Infrared Spectroscopy, Infrared Imaging, UV/Vis, EDX
- Thermoanalysis: DSC, TGA, TMA, DMA
- Chromatography: Size Exclusion Chromatography (SEC), Gas Chromatography-Mass Spectrometry (GC-MS)
- Imaging methods: reflected- and transmitted-light microscopy, SEM, Micro CT

Diverse testing methods from conventional material testing and surface test engineering round off our portfolio. The scope of our consulting also includes expert help to select the best approach to your concern while maintaining an optimal cost-benefit ratio. Our wide network of partner laboratories guarantees the availability of any testing method your problem may require. Still, orders will always be processed discreetly and under our control.

Thomas Eulenstein | Michael Krause | phone: +49 2351 1064-195 | -187

The Kunststoff-Institut Lüdenscheid accompanies transformation processes - holistically and comprehensively and has made it its business to accompany companies more and more as a full-service provider on their way to success. Therefore, it is available to assist with management and strategy issues. In addition, services are provided in connection with project management, marketing and sales, general administration and organization, as well as the management of clusters and networks.

The institute supports according to demand with individual Consulting services and coaching offers, among others, as follows:

- Services in the field of establishment and management of networks and clusters
- Consultations and audits in the QM area, accreditations and medical area.
- Management of ZIM innovation networks
- Marketing, sales support platform management, industry meeting 4.0/K sector
- Consulting

In consulting, the institute provides support for all management and strategy issues that serve to strengthen companies. In addition to the focus on „entry into new industries“ and consultations on fiscal research funding, the following topics are:

- Ideal strategy development processes
- Agile strategy processes
- Market field strategy
- Megatrends/subtrends
- Transformation processes
- Business model innovations
- Vision/mission/mission statement, value concepts, Business segmentation
- As-is analysis and environment radar
- Competitor analysis
- SWOT analysis
- Business Model Canvas
- Technology roadmap
- Marketing & Sales Strategy
- Design Thinking

Education and Training

Marc Weidlich | Daniela Pinno | phone: +49 2351 1064-801 | -811

The Kunststoff-Institut education and training centre activities are characterised as highly practice oriented and guarantee a steady stream of new and up-to-date technical issues through the results and findings of numerous development projects to the participants.

- Appealing premises, including fully air-conditioned seminar rooms and customised technical training school
- Seminars lasting one or more days, crash courses, workshops, week-long training courses and specialist presentations facilitate individual scheduling
- Group exercises in the training school, laboratory and surface technology application centre (AOT) enhance the practical relevance
- Company-specific training courses, both in the institute and directly on-site, domestically and overseas, meet comprehensively specific requirements of companies
- Written and/or oral success controls to document effectiveness
- Symposiums on relevant technical topics help encourage experts to share experiences

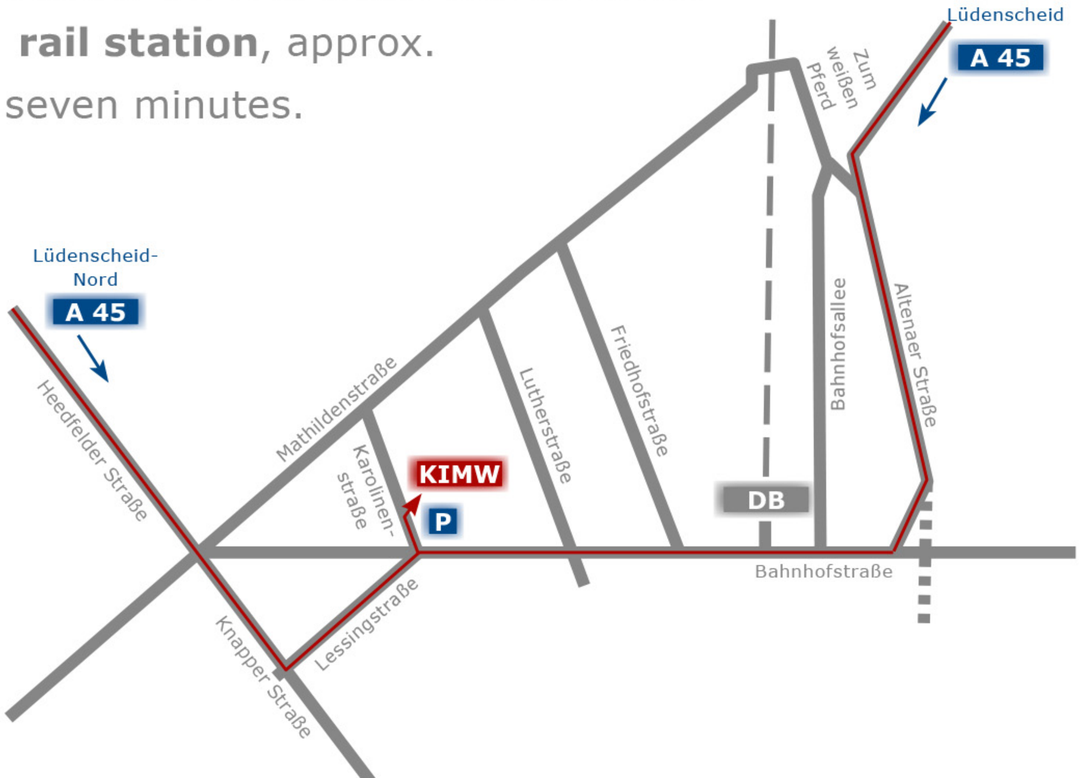
The comprehensive seminar programme, including all key dates and daily schedules can be obtained from us free of charge or downloaded. We would be more than happy to compile a draft plan for education and training tailored to your company.

Our education and training departments focus primarily on recruiting skilled employees.
By combining theory and practice, the qualification as a plastics technology specialist can be acquired within a short period of time.

Arriving by car (A 45)

Exit No. 14, Lüdenscheid Mitte, proceed towards Zentrum or EGC, do not go through the tunnel 'Rathaustunnel' (keep right), after the station on the right, take the third street right into Karolinenstraße.

Exit No. 13, Lüdenscheid Nord, towards Lüdenscheid, following Heedfelder Straße for approx. two kilometres, turn left into Lessingstraße after passing the church on the left hand side, then diagonally left into Karolinenstraße. On foot from **Lüdenscheid rail station**, approx. seven minutes.



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