



klöckner pentaplast

Charlottesville i.Center Capabilities

Who We Are



An innovative workspace focused on fostering development of novel packaging solutions by leveraging kp's expert staff and core competencies.



A hub of creativity where ideas take shape and grow into solutions. Through brainstorming and collaboration with the kp team concepts become realities.



A leader in sustainable film development, committed to meeting current regulatory standards and exceeding customer expectations

kp's technical experts are here to assist in all stages of development:

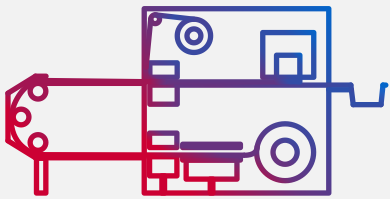
- resin selection
- processing methods
- blister cavity design

Capabilities Overview



BlisterPro[®] XCEL

A unique, in-house service that provides a wide range of services from stability modeling to cavity designs and pack-outs.



Thermoforming

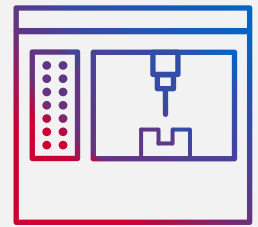
We offer thermoforming with our capabilities ranging from small batch rapid-prototyping to commercial scale pharma, consumer packaging, and medical device pack-outs.



Analytical Testing

State of the art testing equipment combined with knowledgeable staff provide material insights that drive learnings and shorten time to market.

A fully equipped resource that provides a wide range of services from stability modeling to cavity designs and pack-outs.



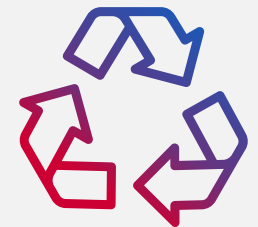
Machine Shop

Lab scale extrusion, compounding, milling, corona treating, coating, and laminating is available in our Innovation Lab and is ideal for projects large and small.



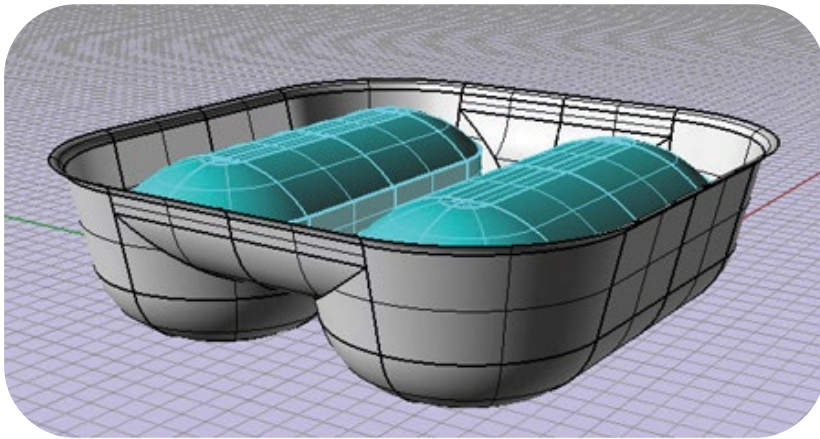
Innovation Lab

As an industry leader in sustainable solutions (the kpNext[™] product platform), the i.Center offers the capabilities and experience needed to develop novel packaging solutions



Sustainable Development

BlisterPro[®] XCEL



Our BlisterPro[®] XCEL services help package designers explore the effects of tool geometry, film types and process conditions, as well as predict the protective barrier properties of the final package without running line trials.

BlisterPro[®] XCEL is supported by in-house finite element analysis, CNC automation and state-of-the-art blister packaging machines allowing for rapid prototyping bringing an entirely new dimension in product and packaging optimization.

<p>1 Stability modeling</p>	<p>2 Material selection</p>	<p>3 Blister design</p>	<p>4 Rapid prototyping</p>	<p>5 Support & services</p>
<p>Utilizing ASAPprime[®] software allows for high confidence in the protection against factors of API degradation</p>	<p>The full kp material portfolio is available within BlisterPro[®] Xcel to provide accurate comparisons across products</p>	<p>BlisterPro[®] modeling software uses FEA to optimize barrier properties and cavity design, eliminating costs associated with over-pack and failed stability</p>	<p>With the full complement of capabilities available at the i.Center, prototypes can be produced to meet challenging timelines</p>	<p>The i.Center team has a diverse background which allows kp to support varied projects. Testing services are frequently expanded to meet customer</p>

- 3-D simulations backed by experimental results
- ASAPprime[®] accelerated product stability modeling software
- ASAP predictive lab studies
- CNC (computer numerical control) automated tooling manufacturing
- Manufacturing consulting and on-site troubleshooting
- Materials and production training programs
- Pentapharm[®] BlisterPro[®] finite element analysis
- Permeability, film-thickness & surface-area prediction of thermoformed cavities
- State-of-the-art blister packaging machine
- Tool designs for optimal barrier performance
- Value engineering consulting to increase line efficiency, speed and quality



BlisterPro[®] XCEL

Moving at the *speed* of your next big idea.

Machine Shop

CNC Equipment



Carbide 3D Nomad 883

- Uses: Rapid prototyping, Sepha EZ-Blister short use tooling
- Cutting Area: 8" (X,Y), 3" (Z)
- Materials: MDF, plastics



Tormach PCNC 1100

- Uses: Polymeric plugs, tooling (Sepha and Uhlmann), and prototypes
- Table Size: 34" x 9.5"
- Materials: Aluminum, Delrin, wax, syndiotactic foam



Okuma GENOS M460-VE

- Uses: Tooling (Sepha, Uhlmann, Koch) and prototypes
- Max Design Volume: 30" x 18.11" x 18.11"
- Exclusively used for aluminum

Minor Machining Work



Grizzly G0757Z

- Uses: Minor tooling alterations and projects
- Table size: 39.4" x 9.5"
- Materials: Aluminum, mild steel, Delrin



Grizzly G4002 Lathe

- Uses: Tooling and part production
- Precision slides and ways to meet demanding machining project needs
- Materials: Metals



Trinco 20/CDB

- Uses: Surface modification of tooling and machined parts
- Mineral based blasting media
- Materials: Metals

Thermoforming

Prototype Thermoformers

Sepha EZ Blister



Type	Blister
Scale	Prototype
Heating	1-Sided Contact
Web Handling	N/A
Plug Assist	No
Max. Format Area (mm)	180 x 120 x 14 (l x w x d)
Max. Output (cycles/min)	Manual
Thicknesses (micron)	150-350

- Laboratory blister machine
- Contact heater
- Utilizes the same tooling as the Uhlmann
- Capable of sealing and punching

Sencorp CeraTek



Type	Food/Med Device
Scale	Prototype
Heating	2-Sided Radiant
Web Handling	Pinned
Plug Assist	Yes
Max. Format Area (mm)	305 x 305 x 76 (l x w x d)
Max. Output (cycles/min)	Manual
Thicknesses (micron)	250-850+

- Deep draw food applications
- IR heating
- Custom tooling
- In-house designed plug assist

Thermoforming

Commercial Thermoformers

Uhlmann B-1240



Type	Blister
Scale	Commercial
Heating	2-Sided Contact
Web Handling	Unsupported
Plug Assist	Yes
Max. Format Area (mm)	156 x 130 x 17 (l x w x d)
Max. Output (cycles/min)	70
Thicknesses (micron)	150-350

- Commercial Scale
- Unsupported web
- Contact heaters
- High production
- Pack outs
- Qualification testing
- Custom tooling

KOCH KBS-KF



Type	Med Device/CP
Scale	Commercial
Heating	2-Sided Contact
Web Handling	Pinned
Plug Assist	Yes
Max. Format Area (mm)	300 x 300 x 70 (l x w x d)
Max. Output (cycles/min)	30
Thicknesses (micron)	150-600

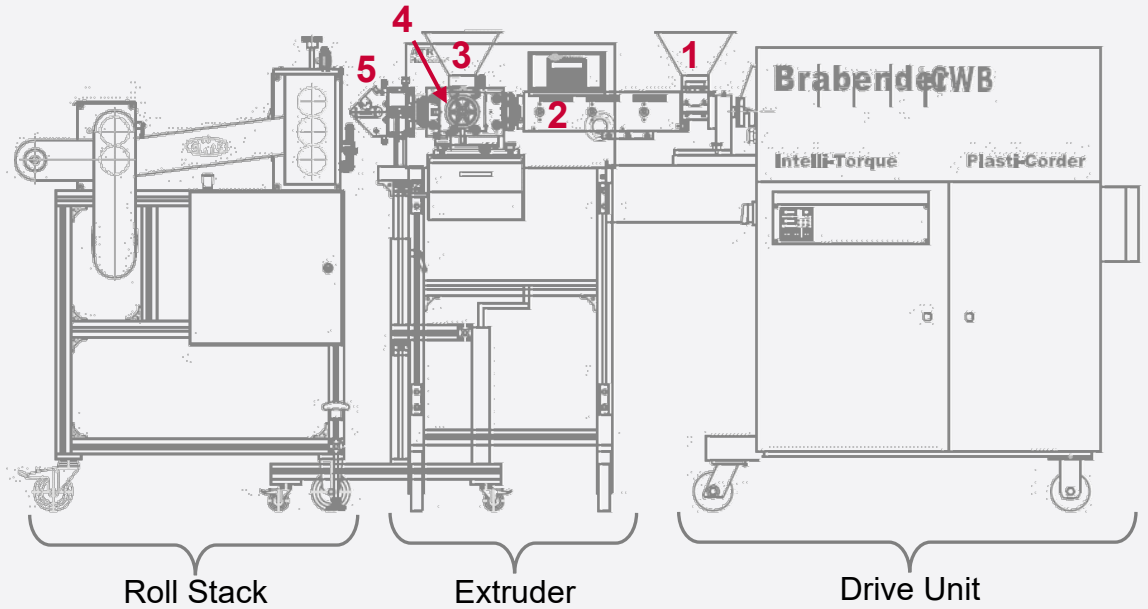
- Commercial Scale
- Chain conveyor
- Deep draw med-device and consumer packaging applications
- Custom tooling
- Fill and seal

Innovation Lab

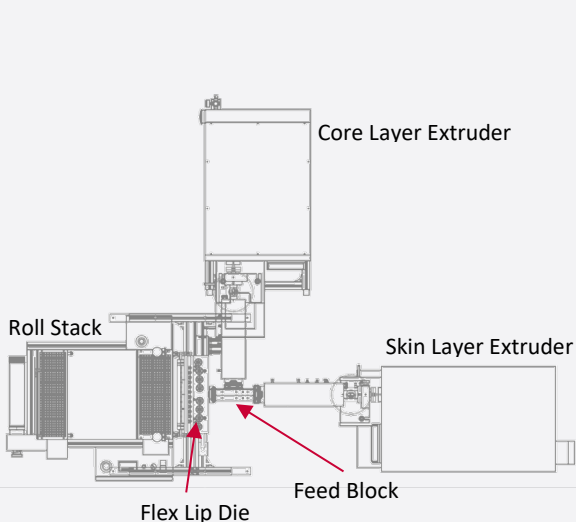
Lab-Scale Coextrusion Line Diagrams

Lab Coextrusion Setup (A/B/A film)

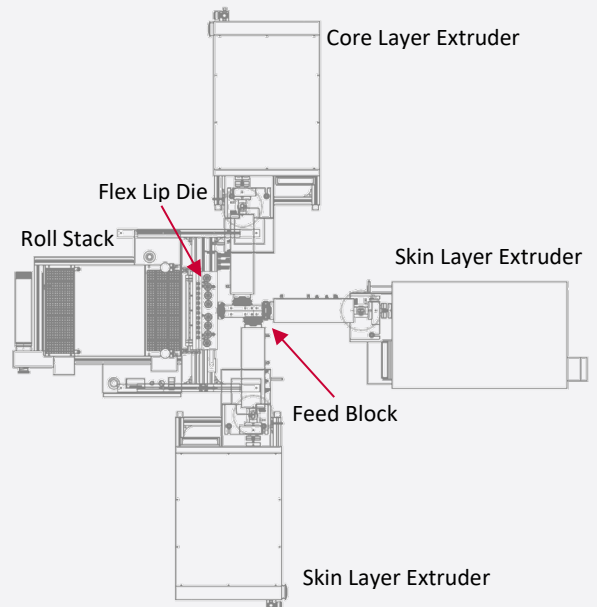
- 1. Resin Hopper (Core / B layer)
- 2. Single Screw Extruder
- 3. Resin Hopper (Skin / A layers)
- 4. Feed block (A/B/A)
- 5. Single Screw Extruder
- * Skin layer extruder hidden



Coextrusion Layouts (Overhead View)



A/B/A Coextrusion Setup (2 Extruders)



A/B/C Coextrusion Setup (3 Extruders)

Innovation Lab

Drive Units, Extruders, and Drive Unit Attachments

Intelli-Torque Plasti-Corder

BRABENDER
Torque Rheometer



- 7.5 HP Inverter Drive
- Torque Range
 - 0 to 400 Nm
- RPM range
 - 0.2 to 250 RPM

TSE 20/40 Attachment

BRABENDER

- Co-rotating twin screw extruder
- Clam shell barrel with segmented screws
- Screw diameter: 20mm
- L/D 30:1
- Used to create compounds and masterbatches



3/4" Single Screw Extruder

BRABENDER

- Single non-segmented screw
- L/D 25:1
- Polymer types processed
 - Polyesters (PET, PETG)
 - Olefins (HDPE, LDPE, PP, COC)
 - Bioplastics (PHA, PLA)



ATR Plasti-Corder

BRABENDER



- 2.5 HP
- Torque Range
 - 0 to 160 Nm
- RPM range
 - 0.2 to 120 RPM

Three Piece Mixer

BRABENDER

- Mixer/measuring head
- Torque rheometer
- 3 heated sections
- Roller blades



Innovation Lab

PVC Processing and Lamination/Coating Equipment



High Intensity Mixer

Zeppelin FML 10 Lab Mixer

- Small version of production high intensity mixers
- Container Volume: 9 liters
- Mixing Tool Speed: 300-4,200 rpm



Two-Roll Mill

LabTech Mill LRM-S-150

- Roll diameter: 150mm
- Roll width: 400mm
- True 3 zone heating
- Used for PVC, PETG, Barex, and other amorphous resins



Corona Treater

Enercon LM5814-D02

- Offline treater for increased flexibility
- Ozone decomposer
- Unwind/Rewind station
 - 3" core
- Maximum treatment width: 14"



Coater / Laminator

TecMaster R&D C/L

- Designed for small-scale product development
- Web Width: 175 mm
- Coat Width: 150 mm
- Multiple Gravure roll coat weights available
- Coatings:
 - Water-Based
 - Not PVdC compatible

Analytical Testing

Barrier Analysis



GINTRONIC GraviTest 6125

- MVTR – Flat film and formed cavity testing capability
- Fully automated temperature and RH controls
- Automated weighing of samples
- Resolution: 0.01mg



MOCON Ox-TRAN 2/22 L

- OTR – Flat film and formed (shallow) cavity testing capability
- High barrier testing
- Fully automated temperature, flow, and RH controls
- Detection range: 0.0005 to 200 cc/(m²*day)



MOCON PERMATRAN-W 3/34 G

- MVTR – Flat film and formed (shallow) cavity testing capability
- High barrier testing
- Fully automated temperature, flow, and RH controls
- Detection range: 0.005 to 100 g/(m²*day)
- Humidity (RH) control range: 100% and 50 to 90% RH

Physical Property Testing



TGA 5500 Discovery

- IR furnace and 25 position autosampler
- Sample weight capacity: 1000mg
- Temperature range: ambient to 1200°C



DMA 850 Discovery

- Clamps: Cantilever, 3-Point Bend, Tension, Compression
- Maximum Force: 18N
- Frequency Range 0.001 to 200 Hz



DSC 2500 Discovery

- Modulated DSC (MDSC) capable
- 54 position autosampler
- Temperature Range: -180 to 725°C

Analytical Testing

Surface Measurement Systems DVS Resolution



- Water, organic solvent, and gas sorption and desorption isotherms of customer products
- Co-adsorption isotherms using two vapors
- Sample masses: 1 to 5000mg
- Broad temperature range (5-85°C)

Tinius Olsen Model 10ST Universal Test Machine



- 10kN frame capacity
- Test methods: tension, compression, flexure, shear, push through, and others
- Test speed: 0.001 to 1000 mm/min
- ETA: Q3 2022
- Heated chamber to be added in 2023

BRUKER INVENIO®-R FT-IR



- Wide band INVENIO-FM mid-IR and far-IR spectral range extension
- Surface detection capabilities
- TGA-IR coupling allows analysis of evolved gases during volatilization

BRUKER SENTERRA II



- Confocal Raman microscope
- Research-grade spectroscopic performance
- Full sample analysis of mono and multi-layer films
- Multi laser excitation

Sustainable Development

kpNext™ R1 Development



Designed for RIC 1 (PET) stream



Plug & Play with current equipment



Superior Optical Clarity

kpNext™ RB5 Development



Designed for RIC 5 (PP) stream



Reduced CO₂ footprint



Excellent thermoforming

Post-Consumer Recycle (PCR) Containing Products



Increased PCR Loading



Consistent Quality



PCR grades (ex. Ocean Bound Plastic [OBP])

Future Development



Foam/Light weighting



Bio-based Resins

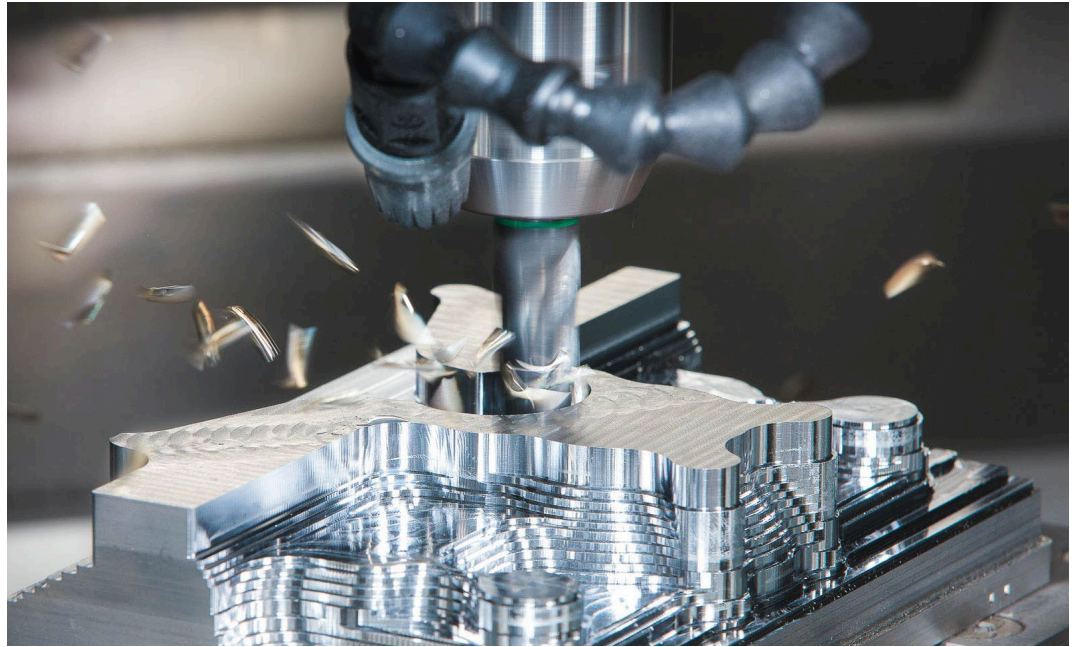


Sustainable alternatives

We're Excited to Support Your Development

To discuss your project needs or schedule a tour, please speak with your sales representative or contact one of our i.Center technical experts.

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