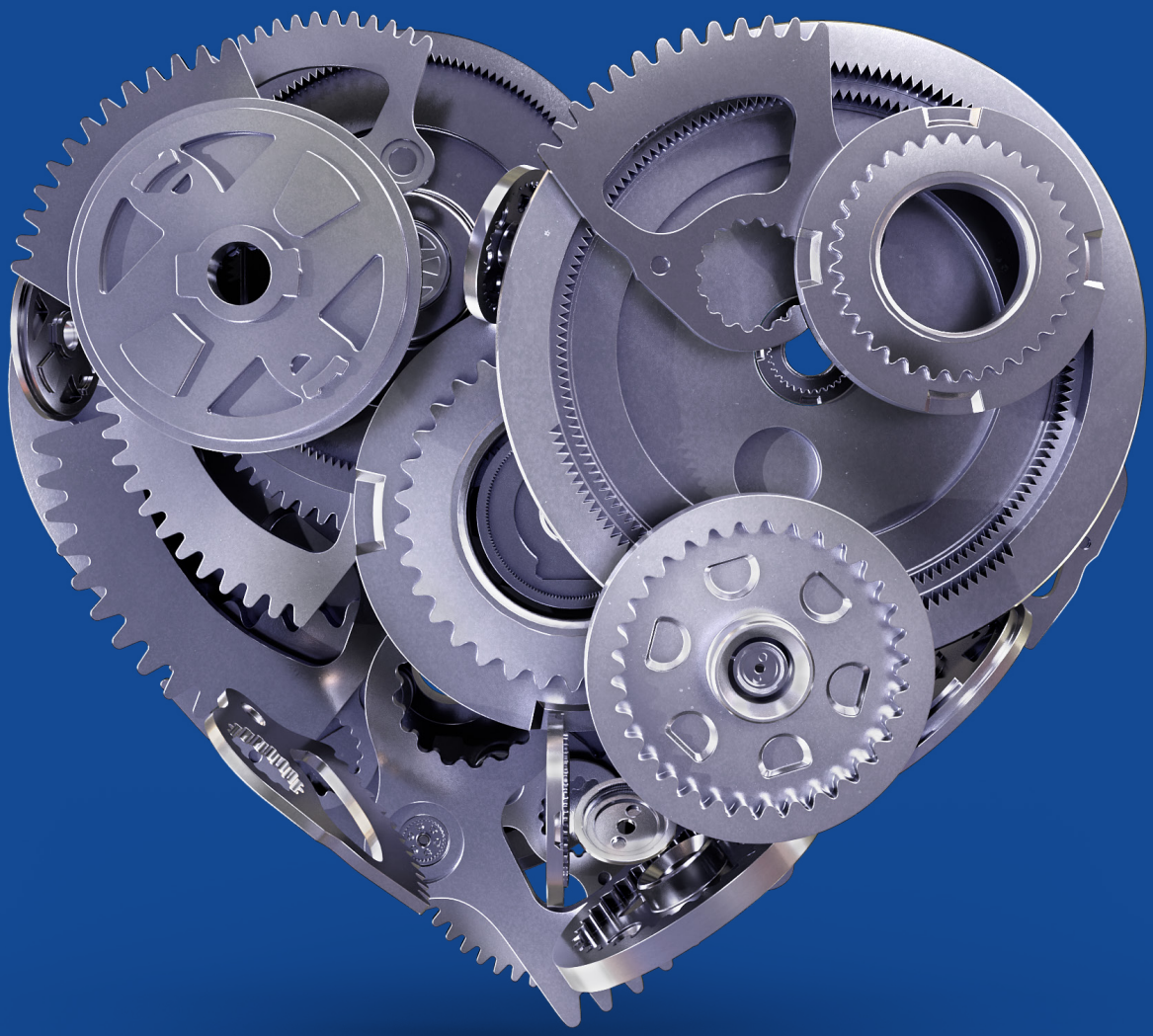


# FINEBLANKING:

## DELIVERING FUNCTION CRITICAL SEATING COMPONENTS AT A LOWER COST



FEINTOOL

Expanding Horizons.

# AUTOMOTIVE SEATING TECHNOLOGY HAS DEVELOPED ALONGSIDE DRIVETRAIN TECHNOLOGY.

***ICE OR BEV. HYBRID OR HYDROGEN. CITY CAR OR PICKUP. EVERY PERSON IN EVERY TYPE OF VEHICLE SITS.***



Feintool has been at the forefront of seating component production at every turn and has helped customers navigate the challenges of producing modern seating systems successfully for decades. Seats need to be: comfortable, secure, reliable, strong and — increasingly — versatile. Over the last five to ten years, interior fit and finish and the level of amenities expected by modern car buyers have skyrocketed. At the same time, increased fuel economy standards and attempting to extend the range for alternative powertrains have driven "lightweighting" — competing requirements that combine to complicate seating design dramatically. Fineblanking delivers net shape tolerances of machining at the cost of a stamping process. This helps manufacturers get the advanced parts they require at the quality they need in the high-strength materials that make them possible — all at a lower cost.

## DESIGN, SIMULATION & PROTOTYPING

A significant factor in Feintool's success is forming true partnerships with customers, working together before the first 3D model is started or prototype is created. Tier one seating suppliers regularly approach Feintool to consult on designs and materials, knowing that we have extensive experience in producing the most complex seating assemblies that meet and exceed all industry standards at the lowest cost possible. Feintool's combination of extensive automotive expertise, proven simulation tools and prototyping capabilities ensure maximum output and efficiency when production starts.



# FINEBLANKING FOR CRITICAL SEATING APPLICATIONS

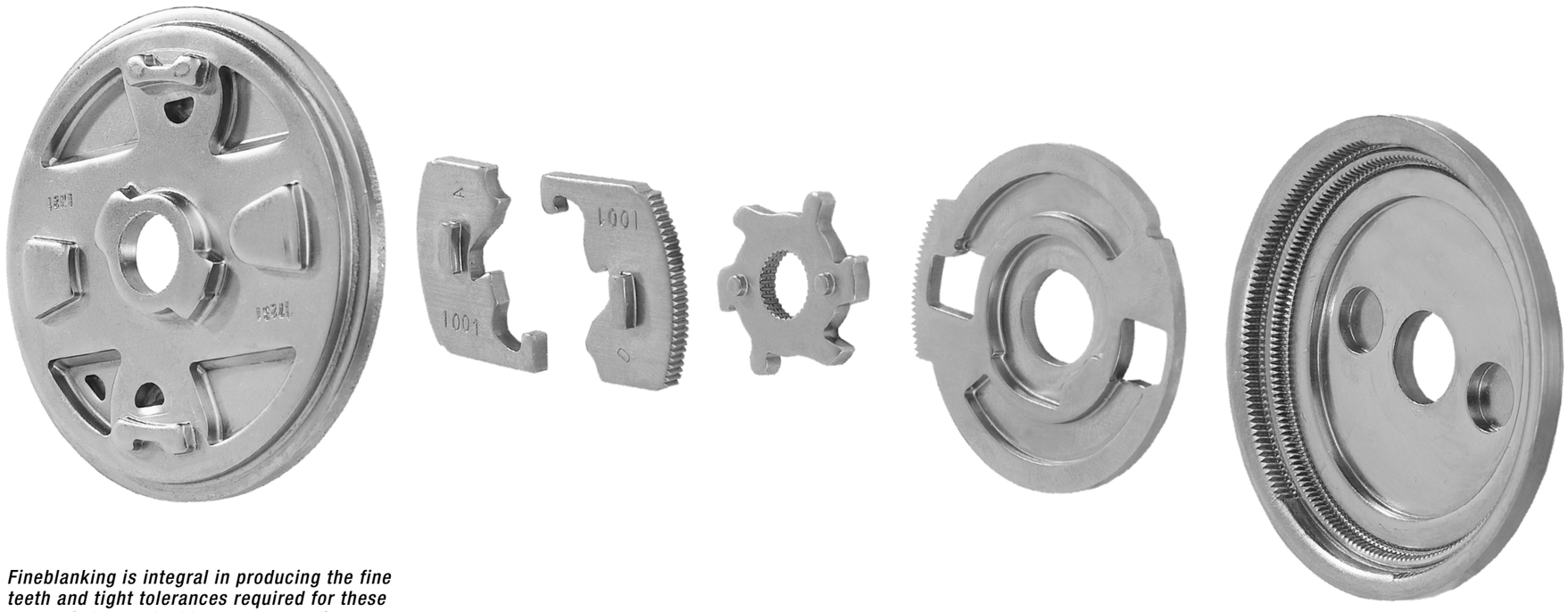
With the dramatic increase of seating system complexity required in modern vehicles, fineblanking enables virtually unlimited part design flexibility to meet the needs of new designs. Bends, counterbores, semi-pierces, coined recesses, perpendicular bends, tall chimneys, and deep drawing can be manufactured cost-effectively while reducing both part diversity and assembly costs.

Automotive seating is a significant market for fineblanking, where it is used to manufacture ***over 200 different components for traditional vehicles.***

## FROM HOW TO KNOW HOW IN SEATING COMPONENTS

Feintool is a global leader in function critical seating components and heart recliners.



***Fineblanking is integral in producing the fine teeth and tight tolerances required for these state-of-the-art double row seat recliners. Fineblanking is used to produce 30 million of these units each year in North America.***

## IMPROVED STRIP LAYOUT 3-OUT VS. 1-OUT 12% MATERIAL SAVINGS

IMPROVED STRIP LAYOUT




# ADVANTAGES OF FINEBLANKING

Fineblanking yields parts with the following characteristics:

- Precise, smooth, crack- and tear-free surfaces
- Excellent flatness to 0.001/inch
- Forming and deburring (if needed) in the same process
- Tight tolerances on positional and dimensional accuracy (which can be held to +/- 0.001 inch on parts up to 1/2-inch thick)
- Hardly any finishing required (net shape)
- High cost-efficiency
- Perpendicularity/edge squareness and minimal taper of the walls in top and bottom surfaces.

# A WORLD OF POSSIBILITIES

## FEINTOOL IS THE PROVEN LEADER IN FINEBLANKING FOR FUNCTION CRITICAL APPLICATIONS



**SEATING LATCH MECHANISM**
*Kick Stand, Cinch Plate, Hook*



**MOTORIZED SEAT RECLINER**
*Upper Gear, Lower Gear*



**SEAT HEIGHT ADJUSTER**
*Tooth Sector*

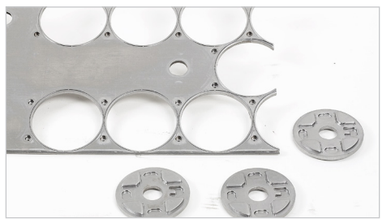


**EASY ENTRY SEAT MECHANISM**
*Upper Plate, Locking Plate, Ring Bearing, Cam, Bracket*





**SEATING MECHANISM**
*Toothplate*



**SEATING MECHANISM**
*Seat Recliner – Guide Plate*



**SEATING MECHANISM**
*Adjuster Toothplate*

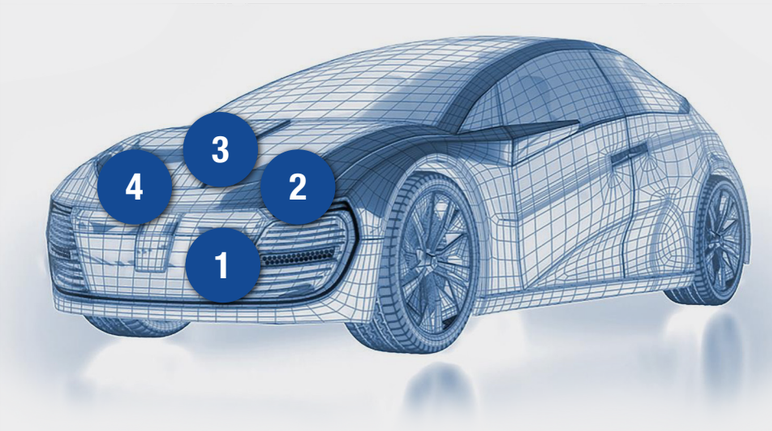


**SECOND ROW SEAT COMPONENTS**
*Upper Recliner Arm, Cam, Stow Bracket, Bellcrank*





## ADDITIONAL FINEBLANKING APPLICATIONS




1



**ELECTRIC DRIVE**
*Endplate Ring*

2



**TRANSMISSION PROPULSION**
*Parking Pawl*

2



**TRANSMISSION PROPULSION**
*Clutch Plates*

3



**THERMAL HEAT EXCHANGER**
*Heat Exchanger Header*

4



**ENGINE LUBRICATION**
*Oil Pump Plate*

4



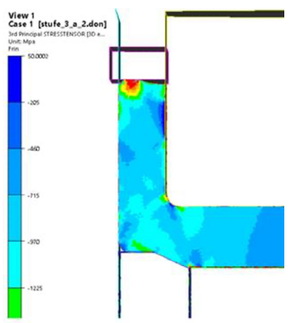
**ENGINE VARIABLE VALVE TIMING**
*Sealing Cover*

# FINEBLANKING & FINITE ELEMENT ANALYSIS

Finite element analysis tools developed by Feintool model the flow of metal during the fineblanking process and allow us to partner with our customers to improve designs and processes even before the first prototype is produced. Specifically, the metallurgical phenomenon particular to fineblanking have been integrated into the tools predict the effects on the metal during the press. Working out of Switzerland, Feintool has partnered with some of the most prestigious universities in Europe to refine and improve their FEA tools to streamline our fineblanking production processes. These simulation tools are critical to producing the most efficient parts possible, saving customers time and money while meeting all the critical functional requirements.



*Chimney FEA cross-section and actual cross-section from FEA/chimney doc*




*Validation testing of an FEA chimney model in high-strength steel proves the accuracy of the optimized tools.*

***"We compare simulations to the prototypes and often see identical results. In some "edge" cases where we see potential for deviation from the modeling, we move to prototyping and feed the physical results back into the model improve it further. We've reached a level of confidence and precision where we have been able to move some components from design to production without going into prototype or soft tooling."***

# PRIORITIES, PRESSURES & PRODUCTION

The push to lightweight vehicles, alongside the pressure to cut costs, means customers want thinner and stronger material. Minimizing part size and costs as much as possible while retaining all the required strength requires new, stronger materials. These materials present forming challenges that are not easily understood or overcome. Using simulation and prototyping hand-in-hand, Feintool works with customers to deliver functional critical net-shape parts that work.

## FIRST “P”
### PLANNING / DESIGN RISK

Can you afford the time to have your competitor out develop you and beat you to market? The right partner will align around your priorities and help you navigate to the best solution.

## SECOND “P”
### PURCHASING RISK

Have you considered the hidden purchasing risks? Is your partner financial stable for the long-term? Are they reinvesting in technology and automation to ensure the highest levels of performance.

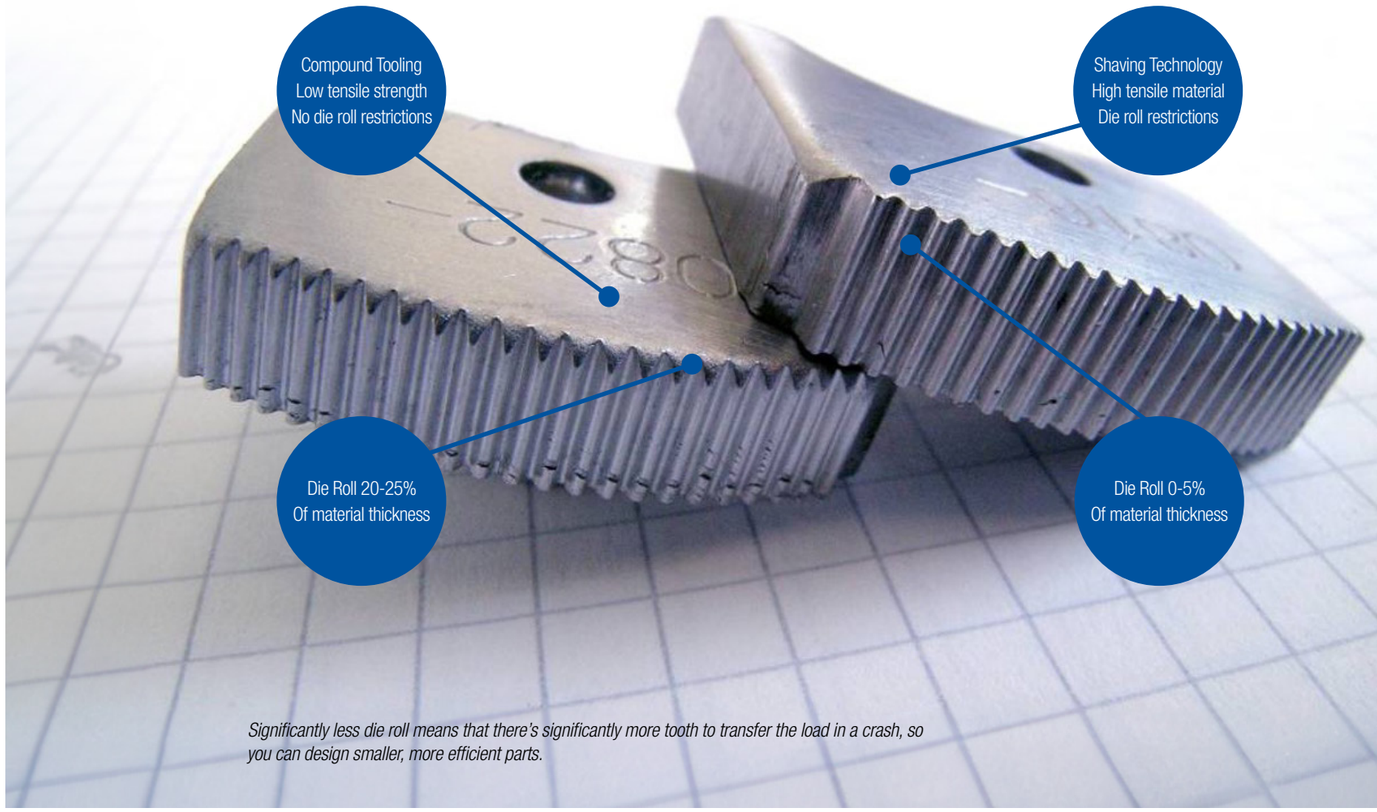
## THIRD “P”
### PRODUCTION RISK

The right partner must deliver on price, but what about their true value? Do they have global and local capabilities? Can they scale production at the high-volume, quality, and delivery you require?

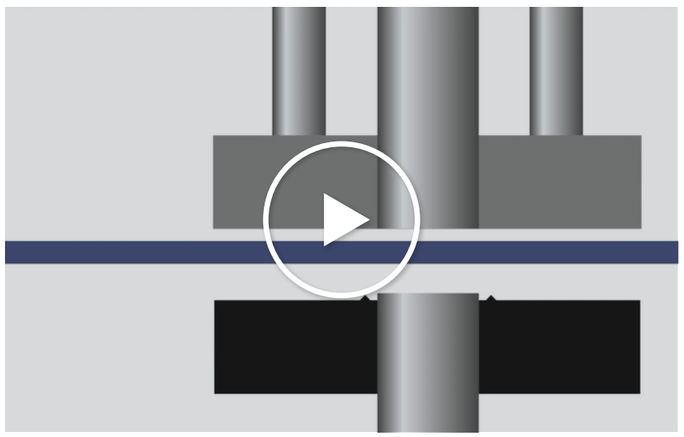
***“If you have a tooth lock that engages the tooth plate of a seat recliner, for example, you want to have the absolute maximum contact surface because that’s what transfers the load in a crash. We don’t have much die roll, so we lose very little of the flank of the tooth — less than 5% compared to 20-25% for other processes — so the entirety of all teeth is engaged.”***



## TECHNOLOGY ON THE MOVE
PAWLS FOR SEAT RECLINERS

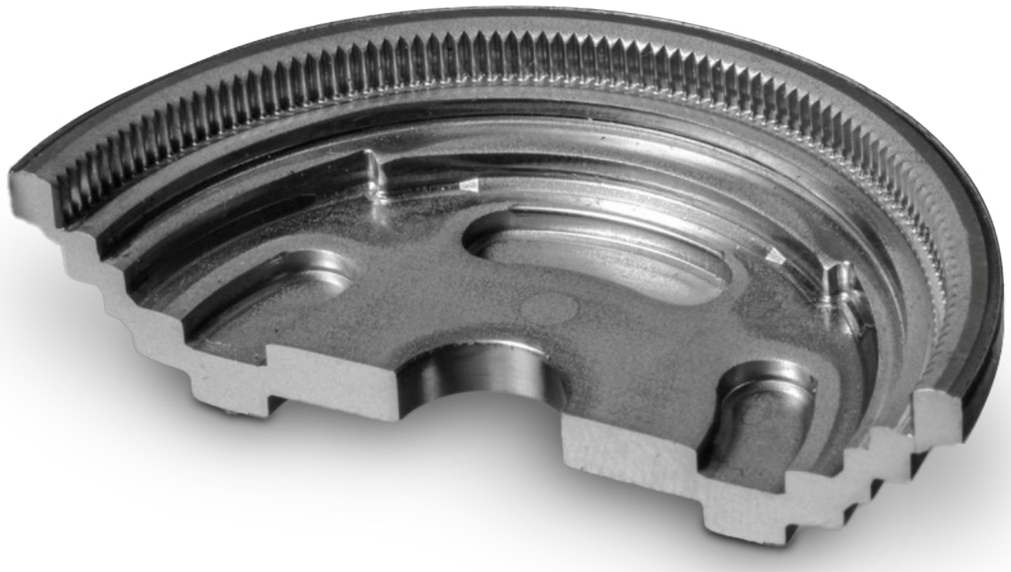



*Significantly less die roll means that there’s significantly more tooth to transfer the load in a crash, so you can design smaller, more efficient parts.*



## *WHAT IS FINEBLANKING?*

The fineblanking process is a hybrid way to form metal by combining stamping and cold extrusion technologies.



# NO CRACKING? NO PROBLEM.

Another advantage of the Feintool fineblanking process for seat component production is the ability to form high-strength steels without cracking. This is becoming increasingly vital as designers push for more and more parts to be made from these advanced steels. A perfect example of Feintool's prowess in forming high-strength steel is the ability create higher and stronger chimneys without cracking or dimensional issues.

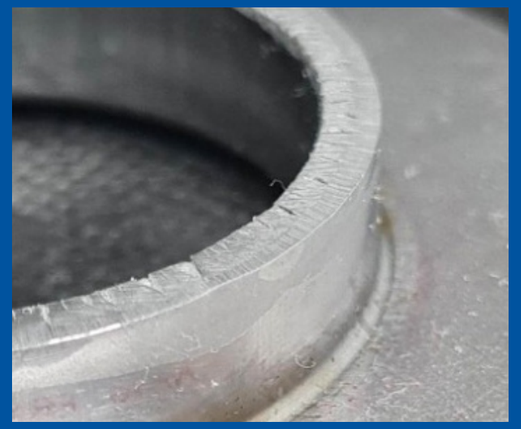
## FINEBLANKING BENEFITS

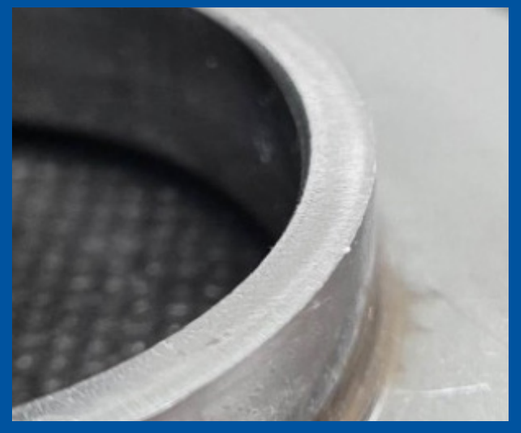
Fineblanking offers manufacturers a variety of benefits compared to other manufacturing methods, including greater cost-efficiency, better quality, and improved productivity. Specifically, manufacturers can experience:

- Reduce costs by eliminating secondary operations
- Faster cycle times
- Produce more consistent part runs
- Material flexibility and stronger parts
- Less die roll for more efficient part designs



***"Fifteen years ago, I don't think anyone would have imagined some of the parts that we produce now. So much forming is happening inside such a small space in the tool, without cracking or dimensional problems."***

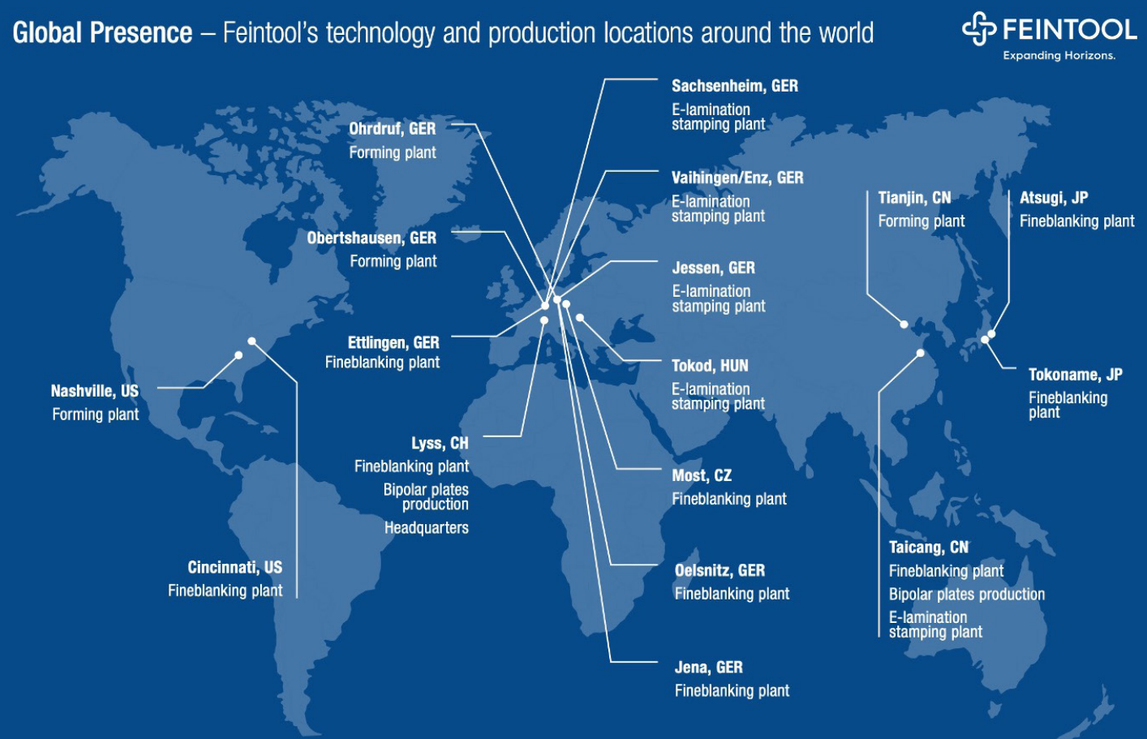


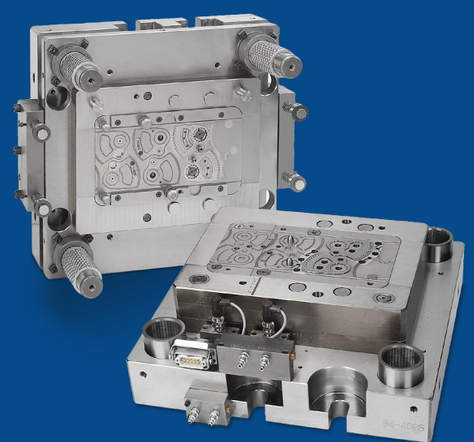


*The difference is stark in these high-strength steel tall chimney examples. Cracking due to the inferior forming process, if not caught in a QC process, could cause catastrophic issues in use.*

## CRITICAL, CRACK-FREE CHIMNEYS

Chimneys in seating components are critically important design features that lend significant strength and functionality to many types of parts. Cracks in chimneys are always a risk to the integrity of the part with the potential to grow in use and compromise the seat's structural integrity. Parts can be sorted and checked via a quality control (QC) system, but a process which is stable and avoids cracking altogether is the best solution. Using a QC process to check for bad parts in an inferior solution that does not add any value and increases scrap costs as it attempts to minimize risk. Producing quality parts consistently should be the focus and Feintool has the process to deliver.



***"One modern vehicle now can require as many seating components as half a dozen vehicles in the past. Cost savings in seating component production now compound quickly and fineblanking shines as an ideal solution for production of these critical parts."***

# RELAX & RECLINE — IN THE BACK?

Everyone in the vehicle now wants to recline. Where we saw fixed second and third rows in the past, modern vehicles, especially SUVs and minivans, now have captain's chairs that recline and have other adjustments. Further, the seat belts for these seats are often being built into the seats themselves, rather than the vehicle body, putting additional strength requirements on the seat structure. On top of that, many seats fold into the floor of the vehicle to increase cargo space when not in use. All these features can also be powered as well, even further complicating designs.

Seating systems have evolved from simple metal brackets to complex mechanisms with multiple hinges, locks, pawls, adjusters, cams, etc.

# DELIVERING QUALITY SEATING COMPONENTS, WITH LOCAL SUPPORT

Feintool's global footprint allows us to deliver local solutions for our customers: 17 plants, three technology centers and tool rooms with prototyping capability in Europe, North America, and Asia. We are constantly looking to the future and monitoring developments in the industry while continuing to strategically expand — our operation in India is planned to be running by 2026, for example.

Our stellar reputation, long-term partnerships, and our ability to deliver millions of functional critical seating components every day around the world prove that Feintool is the global leader in seating component manufacturing.




Whether you are working on the next generation of function critical seating components, improving a current design, or looking for a reliable global partner with local support, we encourage you to talk to a Feintool expert today.

**Feintool.com**

**sales.europePE@Feintool.com**



# FROM HOW TO KNOW-HOW

## Ideas that make future seating concepts shine.

Want to take the guess work out of engineering and part sourcing new seating concepts? With our fineblanking know-how, we collaborate with your team to create and manufacture function critical components for the ultimate seating experience.

**feintool.com/seating**

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Expanding Horizons.