



Chen Hsong

Welcome!



SUPERMASTER TWO-PLATEN

Benefits of True Two-Platen Design

- Long Opening Stroke – Extendable
- Small Footprint
- Uniform Clamping Force Distribution, Stable Under Temperature Changes
- Accurate Mould Open Force
- Superior Part Quality
- Superior Repeatability
- Superior Mould Protection

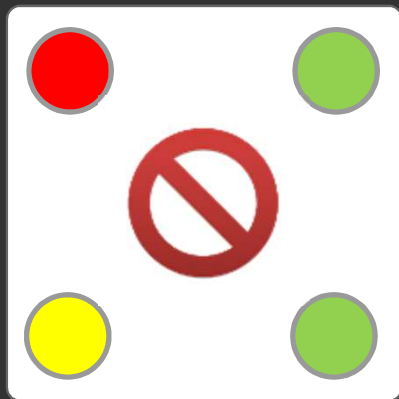
Largest Opening Stroke

	Min. Stroke (m)	Max. Stroke (m)
SM2200-TP	1,600	2,500
<i>XX24000II (toggle)</i>		1,370
SM2600-TP	1,900	2,800
<i>XX28000II (toggle)</i>		2,000
SM3000-TP	2,100	3,000
<i>XX33000II (toggle)</i>		2,150
SM3600-TP	2,200	3,200
<i>XX40000II (toggle)</i>		2,250

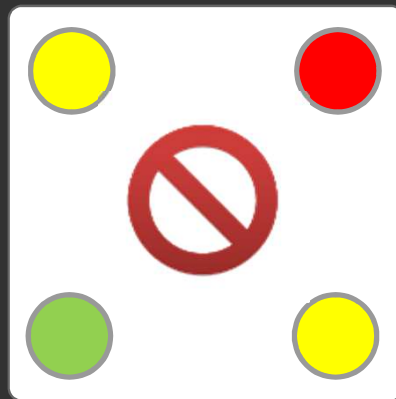
Smallest Footprint

	Machine Length	Footprint Reduction
SM2200-TP	12.3m	
JM1850-C3 (<i>toggle</i>)	14.8m	-16.9%
JM2000-C3 (<i>toggle</i>)	17.4m	-29.3%
XX20000II (<i>toggle</i>)	15.8m	-22.2%

Uniform Clamping Force Distribution



Toggle



Toggle



Two-Platen

● > 10%

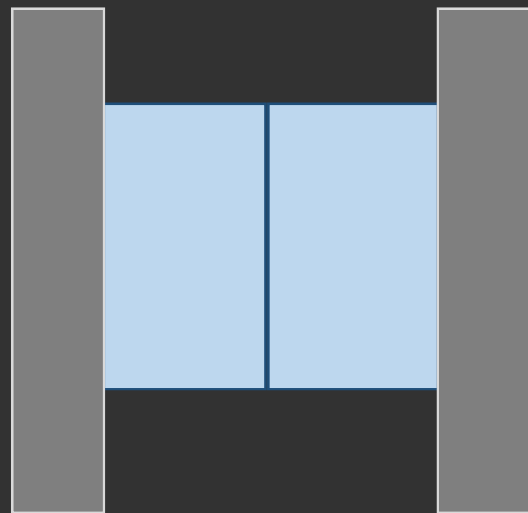
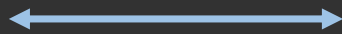
● 1-10%

● < 1%

- All four tie-bars must convey the same clamping force for best part quality without flashes and internal stresses
- Two platen machines guarantee absolute clamping force uniformity
- Uniform clamping force is difficult to achieve in a toggle machine

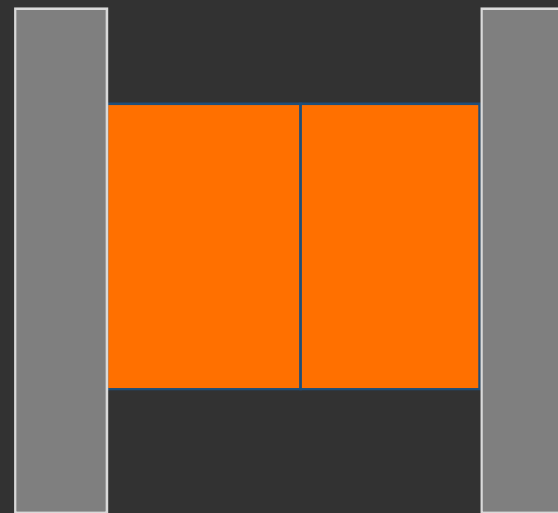
Clamping Force Unaffected by Temperature

low temperature: narrower



Toggle clamping force : 300 tons
Two-Platen clamping force : 300 tons

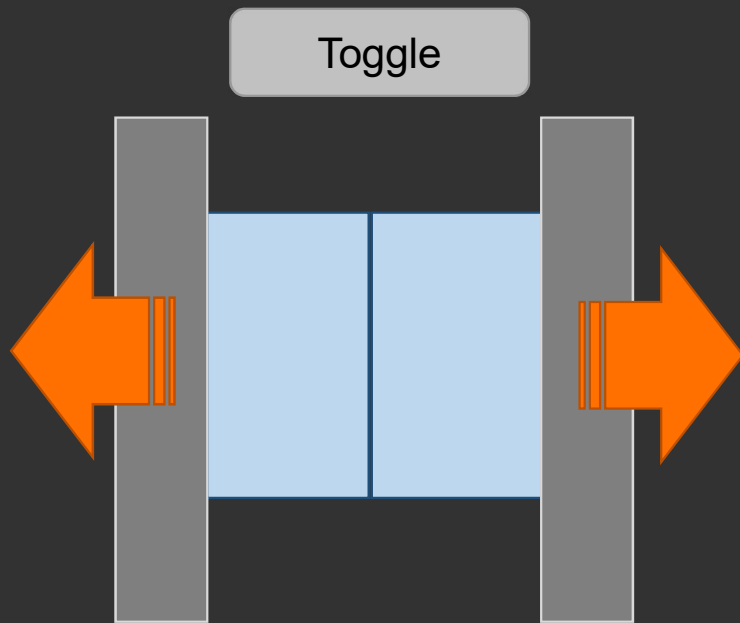
high temperature: wider



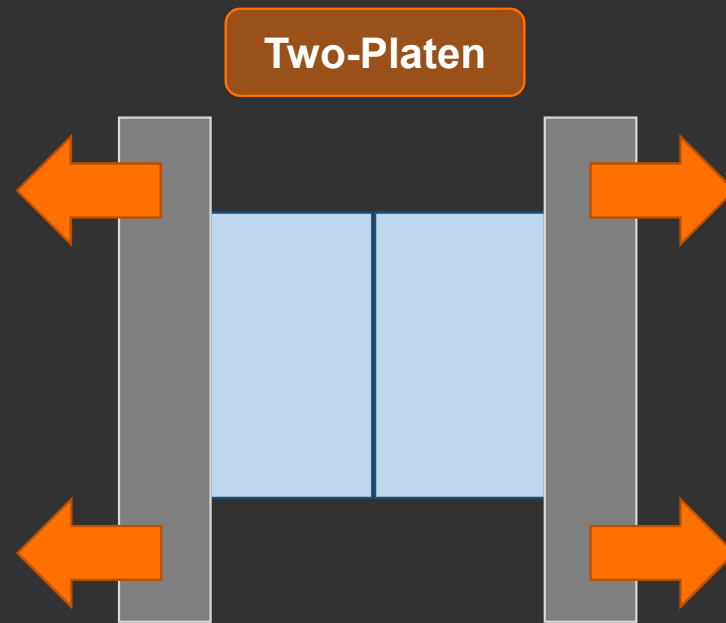
Toggle clamping force : 380 tons!
Two-Platen clamping force : 300 tons

Excessive clamping force causes undue wear on tie-bars, reducing life of machine as well the mould

Accurate Opening Force



Mould opening magnified via toggle mechanism
Difficult to control and imprecise



Mould opening via hydraulic cylinders
Accurate and precise force



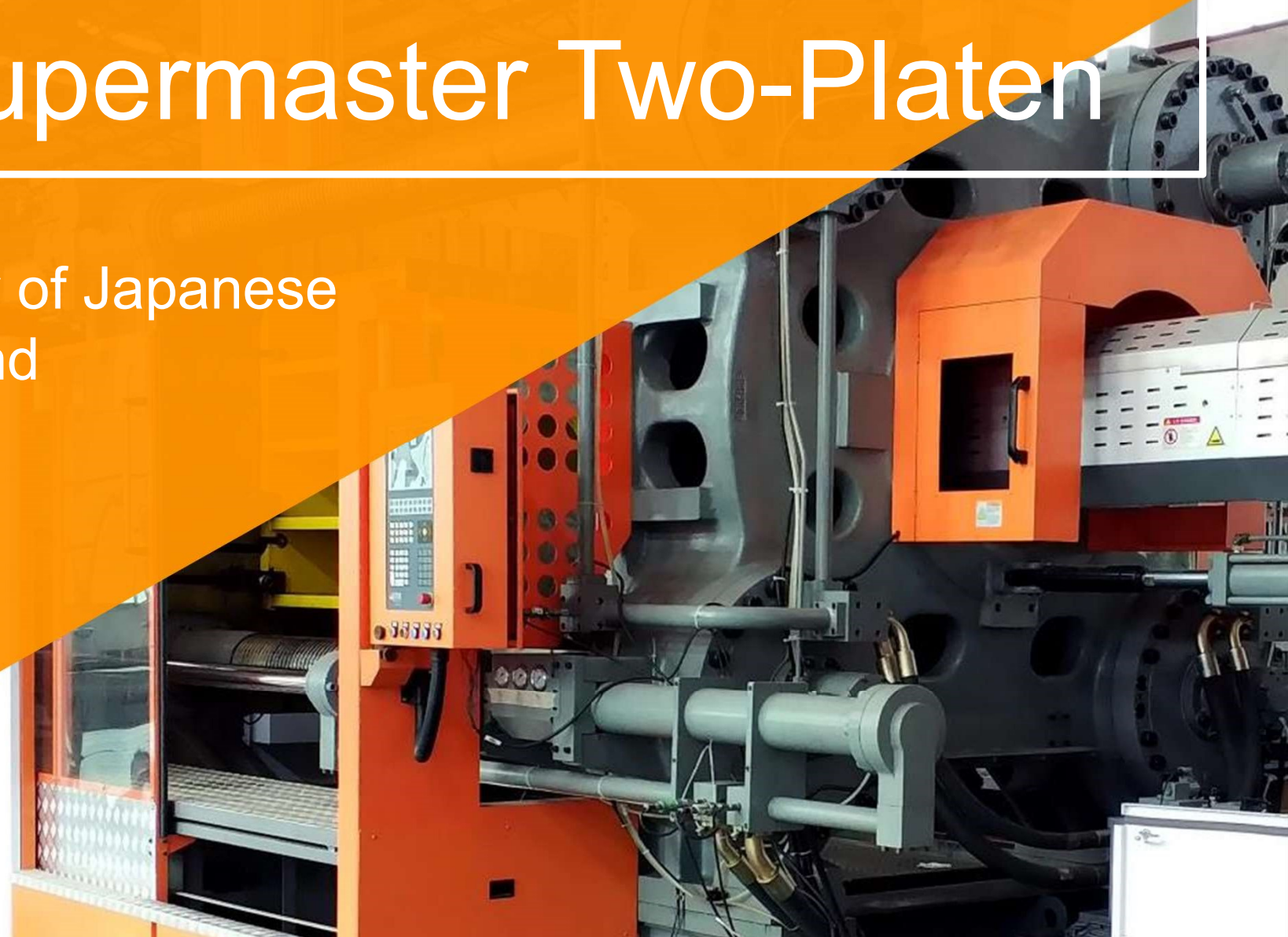
Two-Platen – A Machine for All Occasions



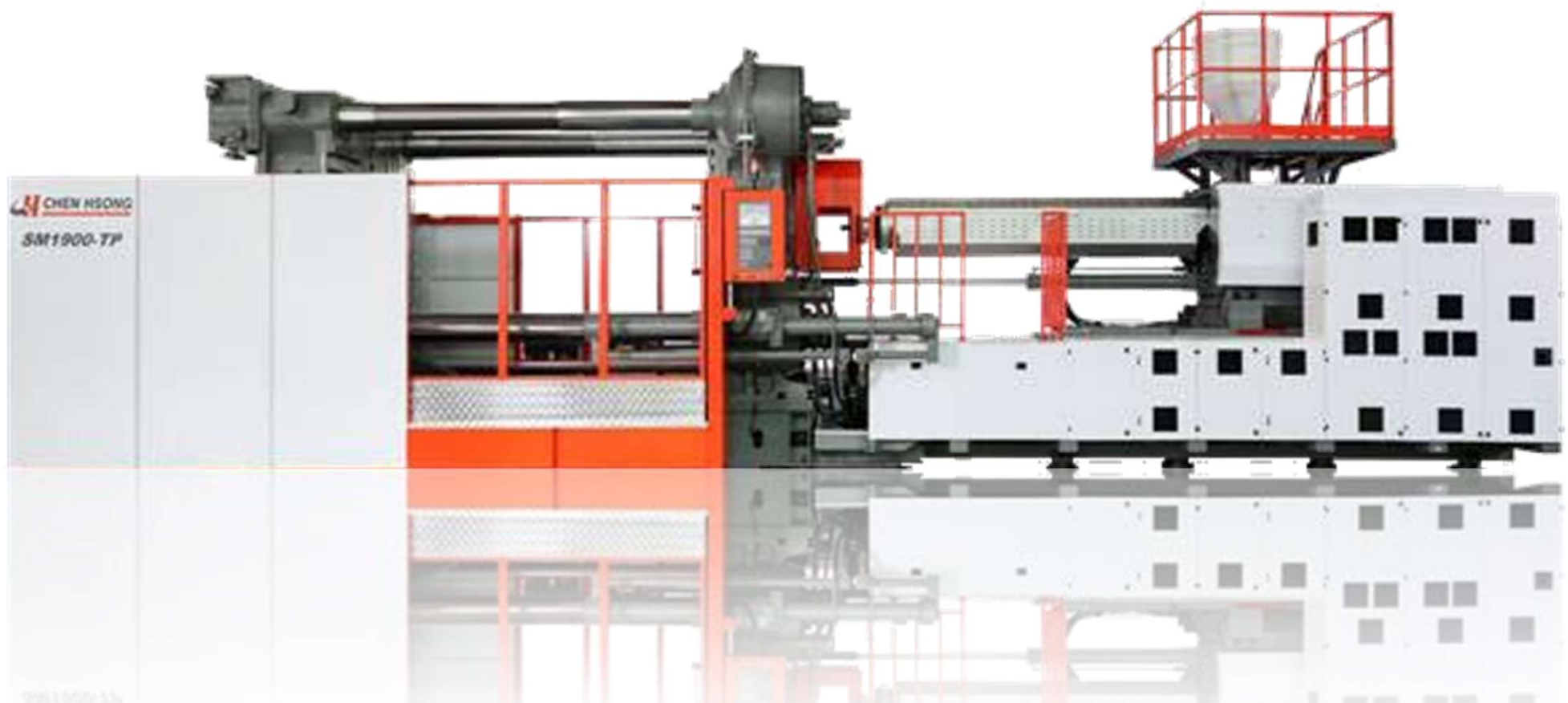


Supermaster Two-Platen

A Brief History of Japanese
Technology and
Cooperation



The SUPERMASTER TP Advanced Series



2006 – Project Started by Mr. **Shioda**
ex Chief Engineer, Mitsubishi



2007 – First True Two-Platen in China



2009 – First Servo-Driven Two Platen



2010 – SM2600-TP in FRANCE



2011 – Mitsubishi 2000MMV made by Chen Hsong



ChinaPlas 2011

2012 – Mitsubishi 1600MMX
made by Chen Hsong



ChinaPlas 2012

2012 – SM4500-TP to EUROPE



2013 – SM6500-TP to ISRAEL



2015 – SM3600-TP to GERMANY



2016 – SM6500-TP to AUSTRALIA

Innovative Y-Injectors!



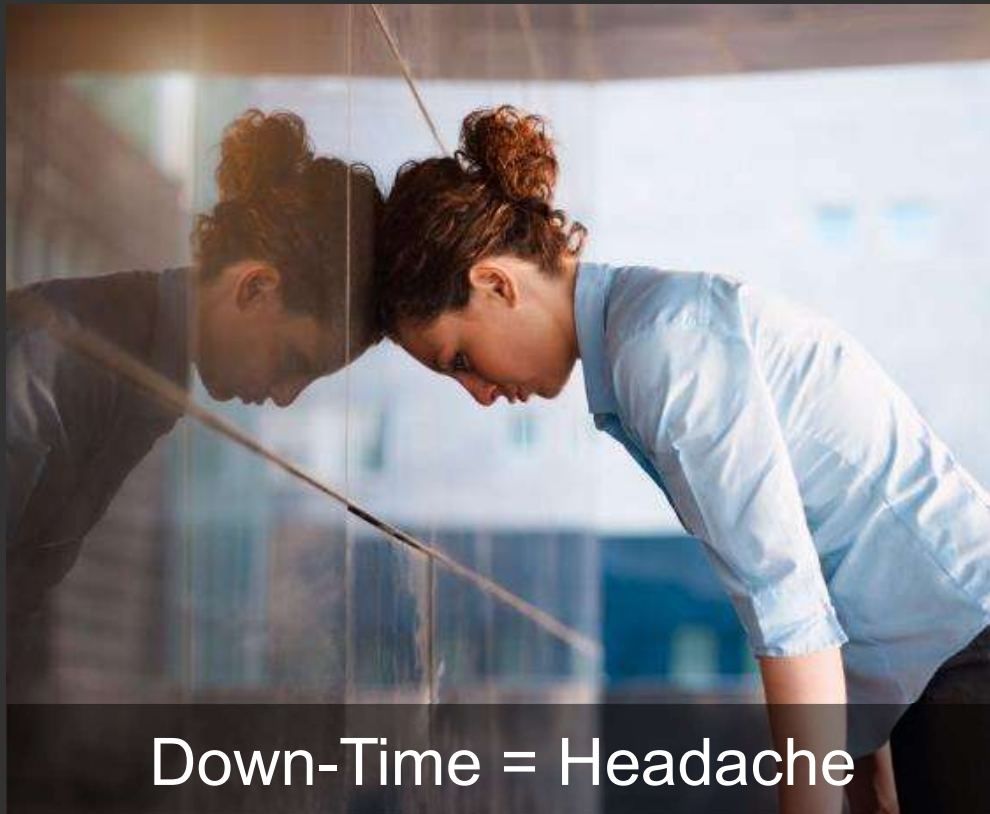


Non-Stop™ Technology

Eliminates Unscheduled
Down-time



Why Does Unscheduled Down-Time Happen?



1. Wear-and-tear on mechanics
2. Component quality degrades
3. Inability of control system to adapt to machine condition
4. Operator error

Foundations of Long-Term Stability



The Philosophy of Not-Making-Things-Worse

Precision Hydraulics® turn all mechanical motions to silky smoothness, reducing unnecessary wear-and-tear

Rock Solid Mechanics

Patented Japanese mechanical design allows for superior performance while maintaining machine at top shape

Dynamic Control Systems

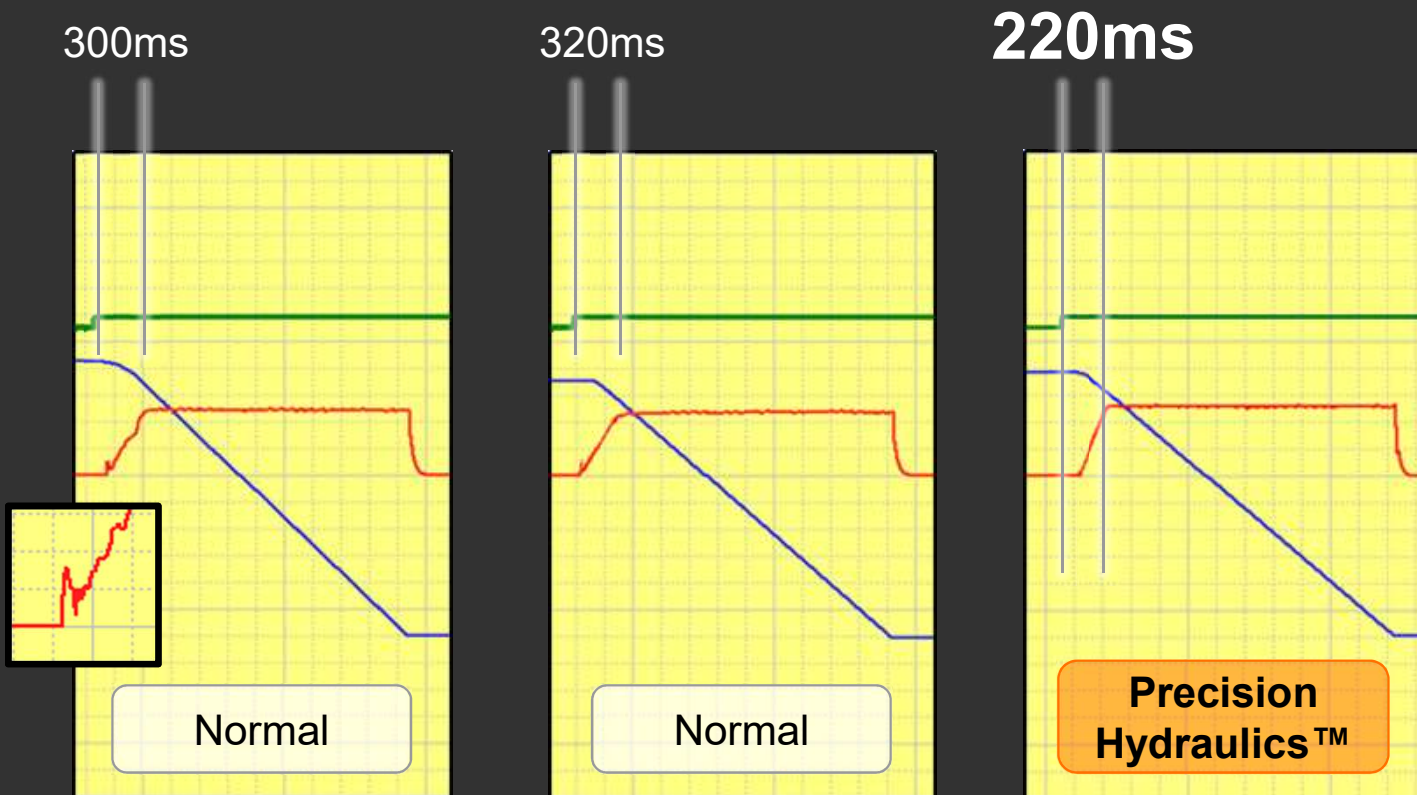
Adapts to changes in real-time for smooth, shocks-free mechanical motions



What a Difference Precision Makes

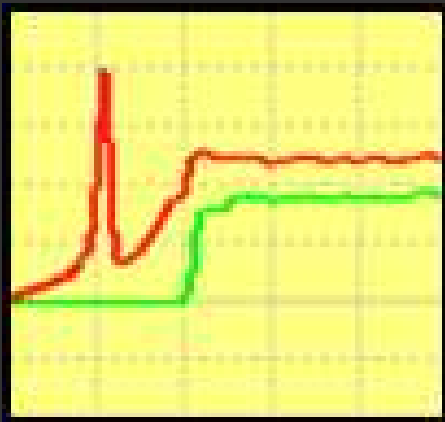
Precision Hydraulics®

Injection Speed Response (0 → 99%)

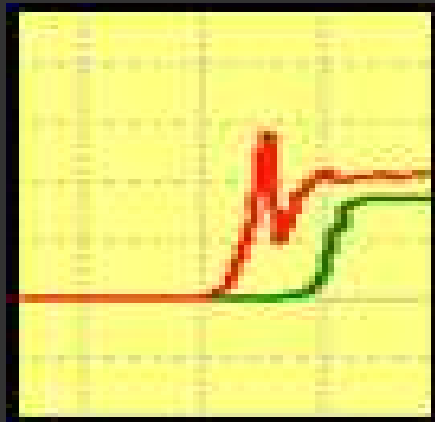


- Injection speed response curves from 0-99%
- Smaller numbers are better
- Look for: smoothness, no fluctuations, no overshoots

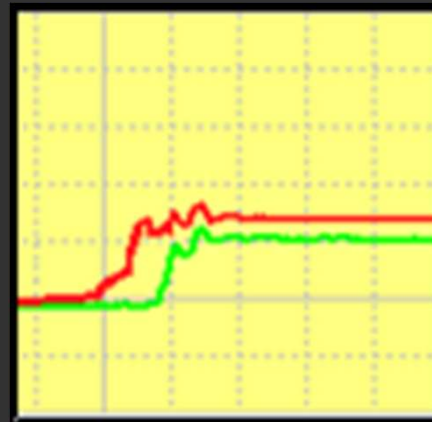
Injection Pressure Control



Normal



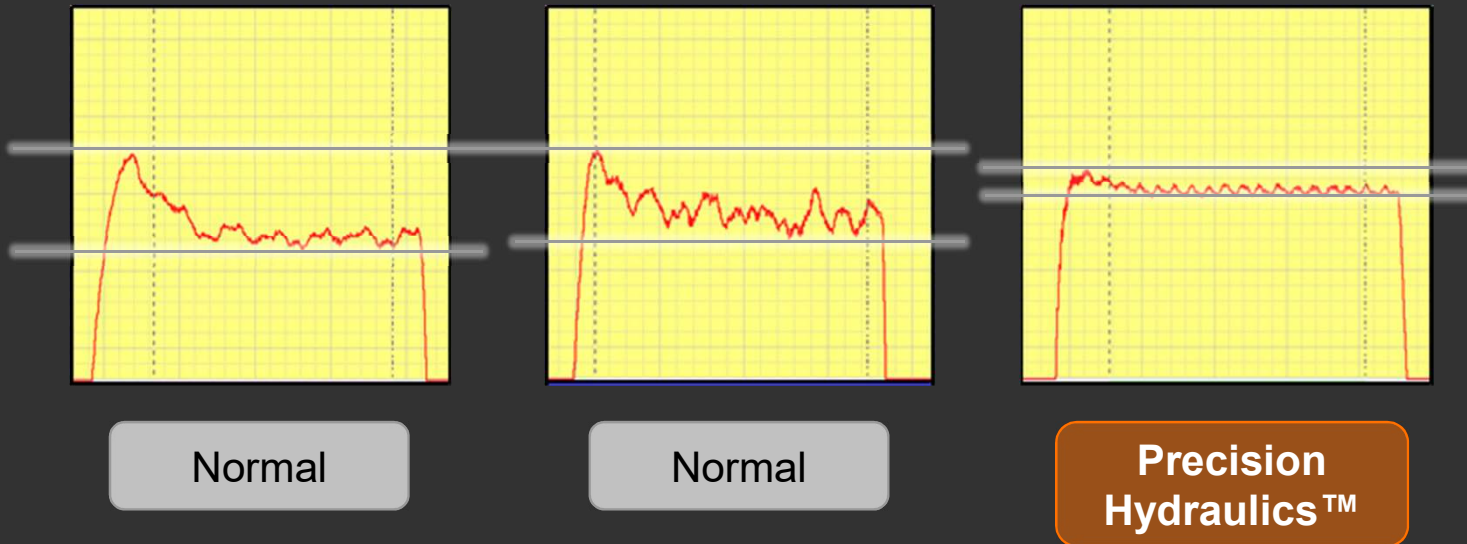
Normal



**Precision
Hydraulics™**

- Look for: smoothness, no fluctuations, no overshoots
- Injection pressure control is vital to ultimate part quality
- Special materials (e.g. engineering resins) are particularly sensitive to pressure fluctuations
- Stable injection pressure has a definitive impact on yield rates

General Pressure Control



- Look for: smoothness, no fluctuations, no overshoots
- Most machines have low quality pressure control – i.e. high fluctuations and overshoots
- *Precision Hydraulics*® yields precise pressure control
- Precise pressure control is vital for demanding, pressure-sensitive applications such as optical parts

Case: Automotive Glass Rimming



- World's largest supplier of automotive glass asked for a way to put plastic rims around glass panels
- An SM1050-TP with *Precision Hydraulics*® successfully rose to the challenge

Automotive Glass-Rimming Solution



Cycle time : 90s to 55s
Yield : 95% to 99%

Repeatability within
 $\pm 0.1\%$

Precision Hydraulics®

Precision at HIGH SPEED

(sustainable fast platen movements and injection)

- Next-Gen computer control algorithms and hydraulics circuit design
- Developed by senior Japanese engineers with decades of technical expertise, using advanced hydraulics simulation software
- Enhancement of 3rd Gen Servo-Pump technology: from 3G to 4G
- Eliminates unnecessary pressure drops for ultimate precision

Rock-Solid Stability

(minimal vibrations and shocks even running at max. speed)

High Repeatability

(tolerances within 0.05%)



Ultimate Modularity

Flexible Mix 'n Match

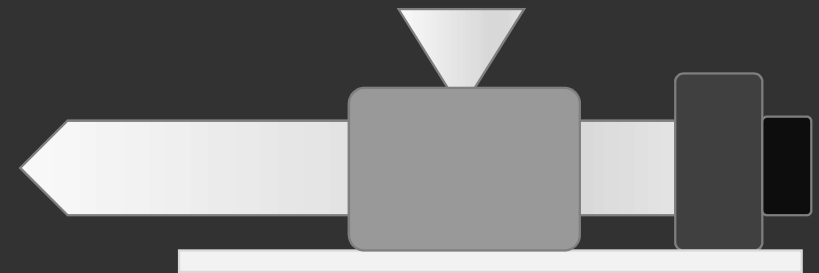


Mix 'n Match the **PERFECT** Machine for **YOU**

14 Clamping Units
(700 – 6,500 tons)



29 Injection Units
(2 – 110kg shot weight)



The Right Machine for the Right Job



Automotive

LARGE clamp, SMALL injection



Pallets

LARGE injection



Waste Bin

LARGE stroke



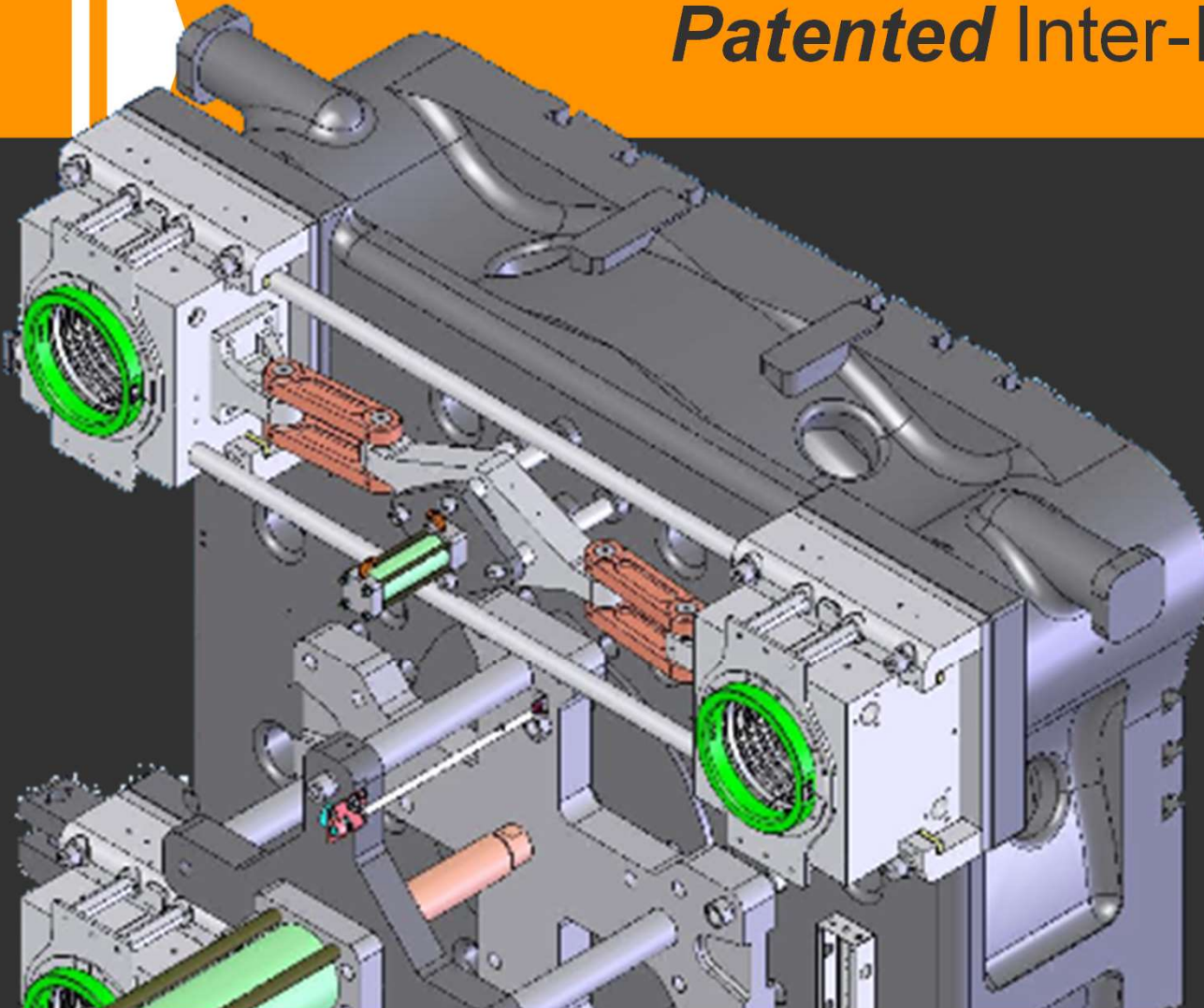
World-Class Design



Fast and Precise – Benefits of Advanced Japanese Mechanical Design

Example: SM1900-TP	
Max Opening Speed	750mm/sec.
Clamp Open	2.8 sec.
Clamp Close	3.8 sec.
Dry Cycle (EU6)	6.6 sec.
Opening Stroke	1,170mm
Mould Open Position	±0.1mm

Patented Inter-Locking Mechanism

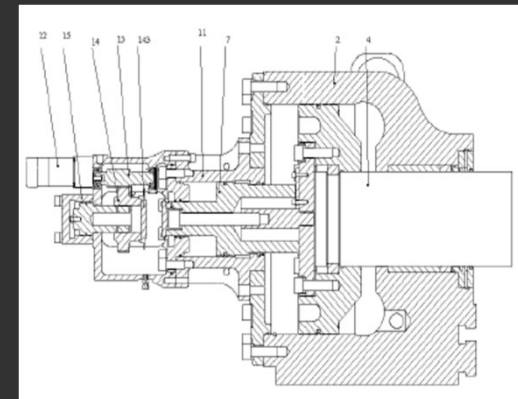
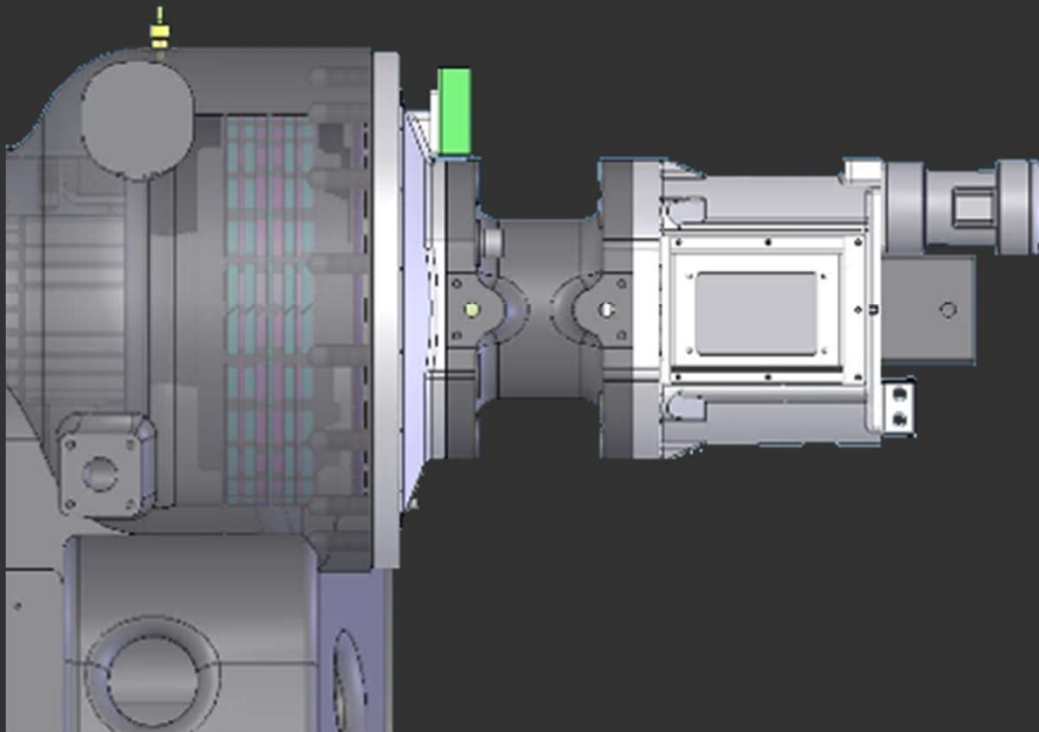


- Pure Mechanical
- Fast
- Smooth
- Noiseless
- Reliable
- Synchronous

Patent no.
ZL 2007201514065

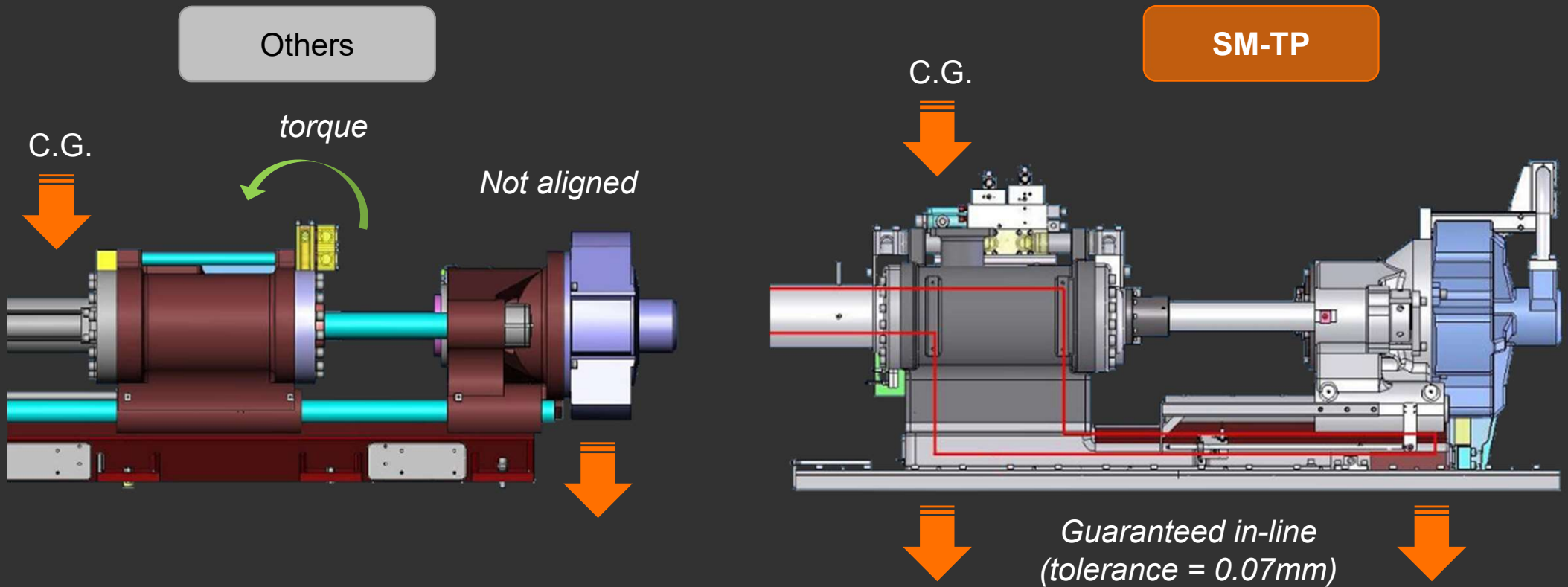
Patented Stopper Mechanism

- Pure Mechanical Design
- Very Fast & Very Reliable



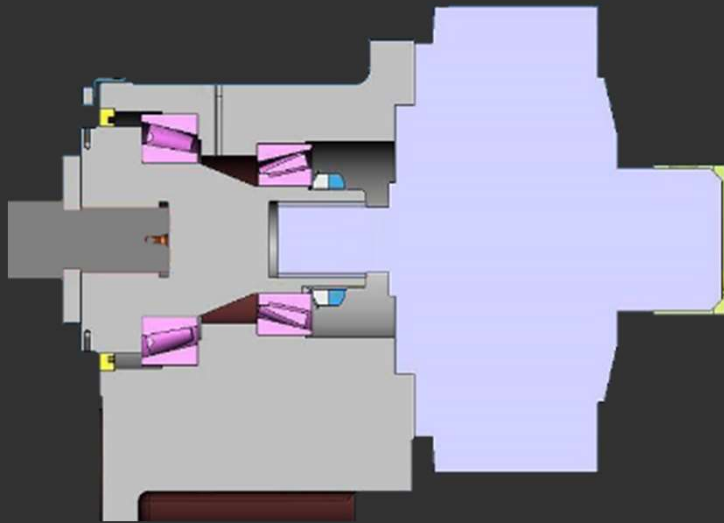
Patent no.
ZL 200720151407X

Injection Unit Design Guarantees Alignment



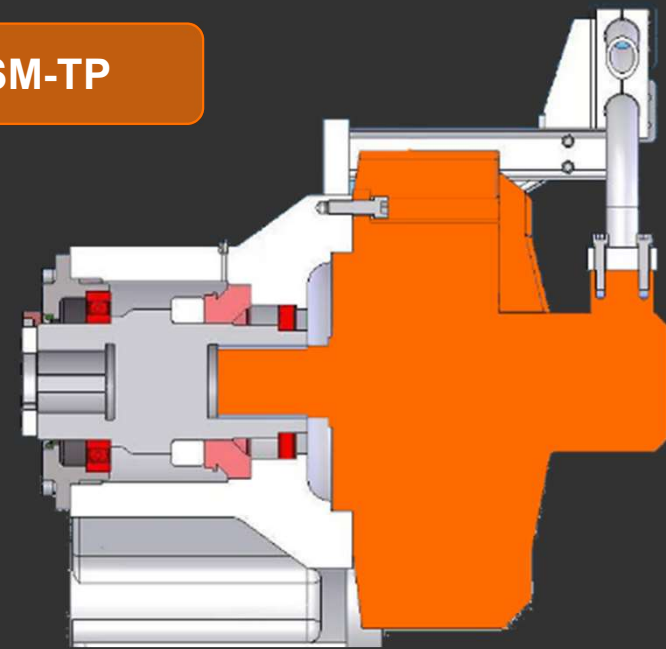
Guaranteed Alignment for Hydraulic Motor

Others



*Traditional design easily
subject to distortion*

SM-TP



*Three bearings
guarantee alignment*

All-Purpose Barrier Screw Design



Japanese barrier screw design
for wide applications window
and superior melt quality

Very high precision for
wide range of resins
(up to $\pm 0.3\%$)

50°C High Heat Stress Test



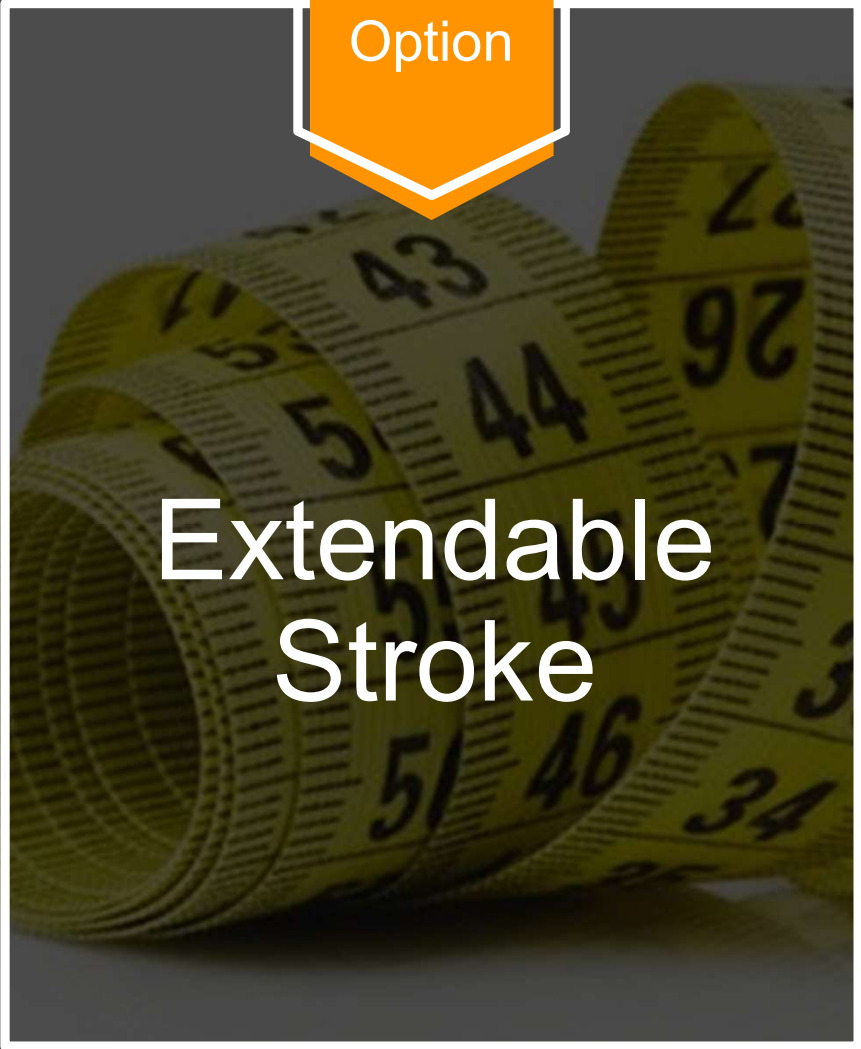


Advanced Options

Special Solutions
for Special Applications

An orange shield-shaped label with a white border containing the word "Option".

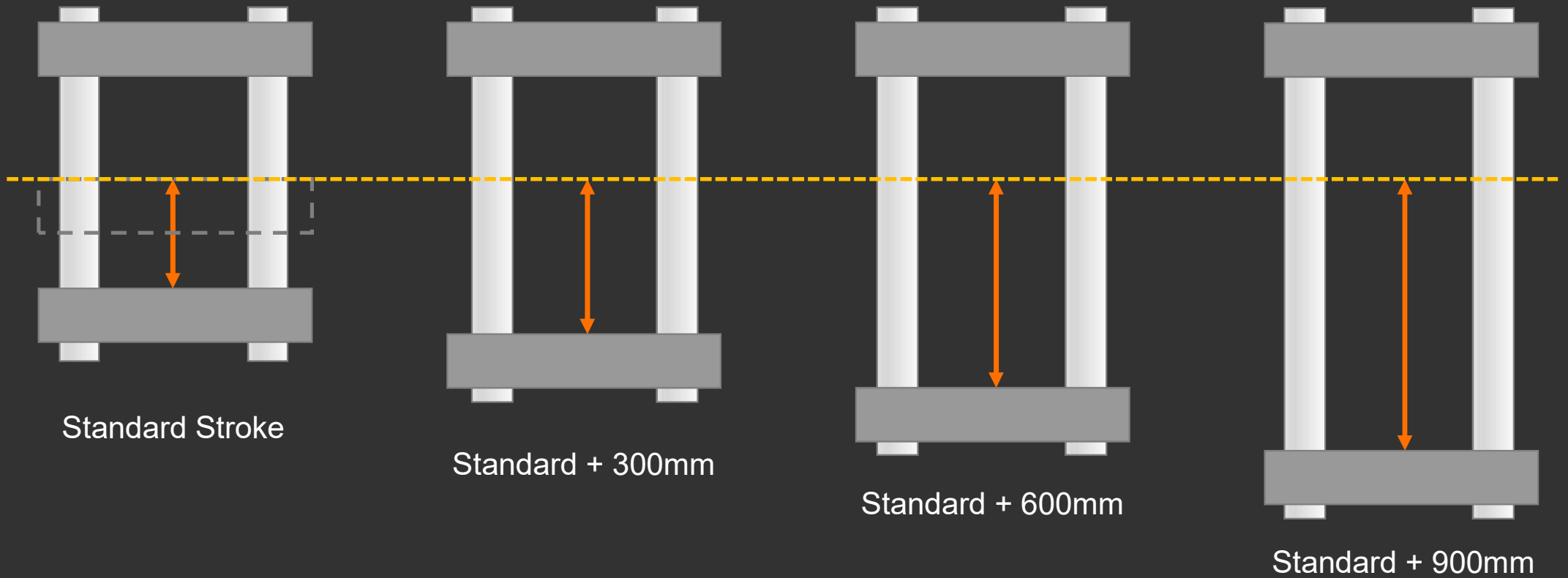
Option

A white rectangular frame containing the text "Extendable Stroke".

Extendable
Stroke



Stroke Can Be Lengthened in Standard Steps of 300mm





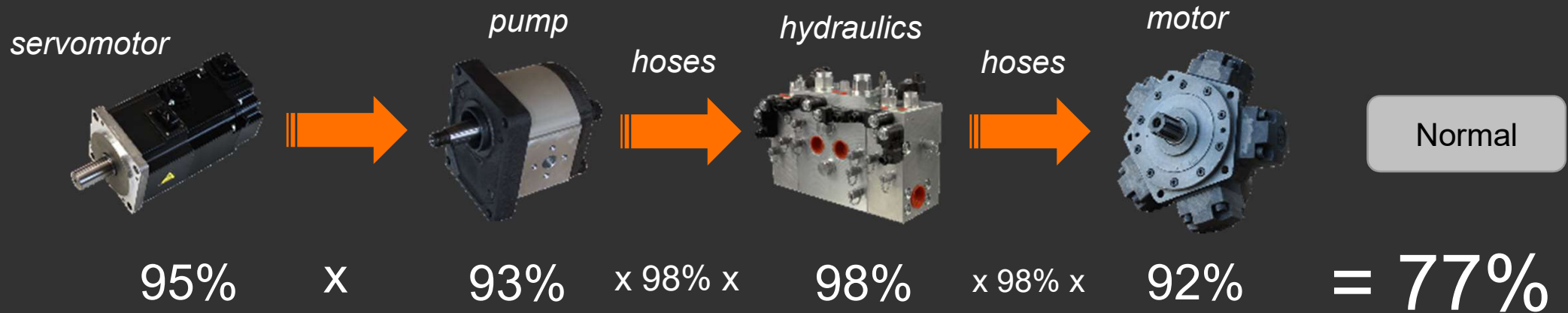
Option

e-Drive

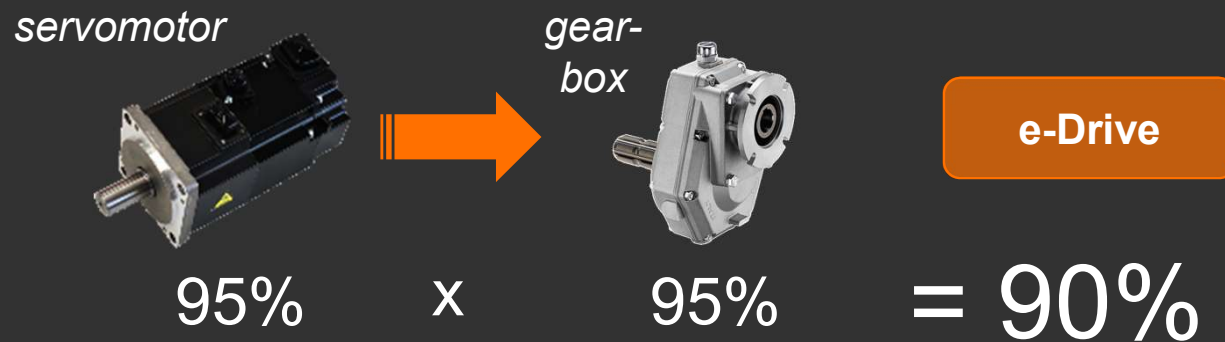
Servomotor parallel plasticizing

- saves cycle time
- saves energy
- silent operation

Energy Efficiency Comparisons – e-Drive



Note: Plasticizing typically consumes the most energy in an injection moulding machine

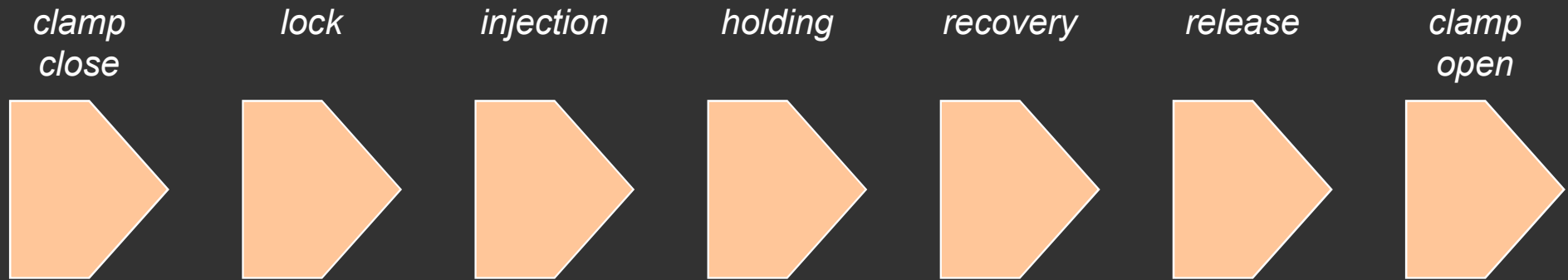


Option

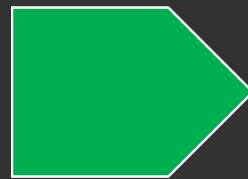
Compressive Moulding



Two-Stage Clamp Closing



Stage 1 closing
leaves gap
tolerance < $\pm 0.1\text{mm}$



Stage 2 clamp closing
= Compressive Moulding

sequential injection

Precision Hydraulics™

Benefits of Compressive Moulding

- High dimensional stability, especially for large, thin products
- Reduce injection pressure
- Reduce clamping force required
- High product quality – low internal and residual stress
- High good-part yield
- High precision control on injection process
- Enables over-moulding of sensitive materials (e.g. fabric)

Case Study: Automotive Fabric Over-Mould



- Audi Q5 seating part
- Yield improved from 93% to 99% due to reduced internal stress
- Cycle time reduced from 120s to 70s
- No post-processing step necessary



Option



Extractable
Tie-bar

Benefits of Extractable Tie-Bar



- Perfect for low ceiling clearance
- Faster mould changes
- Tie-bar is only extracted during mould change – not during normal operations



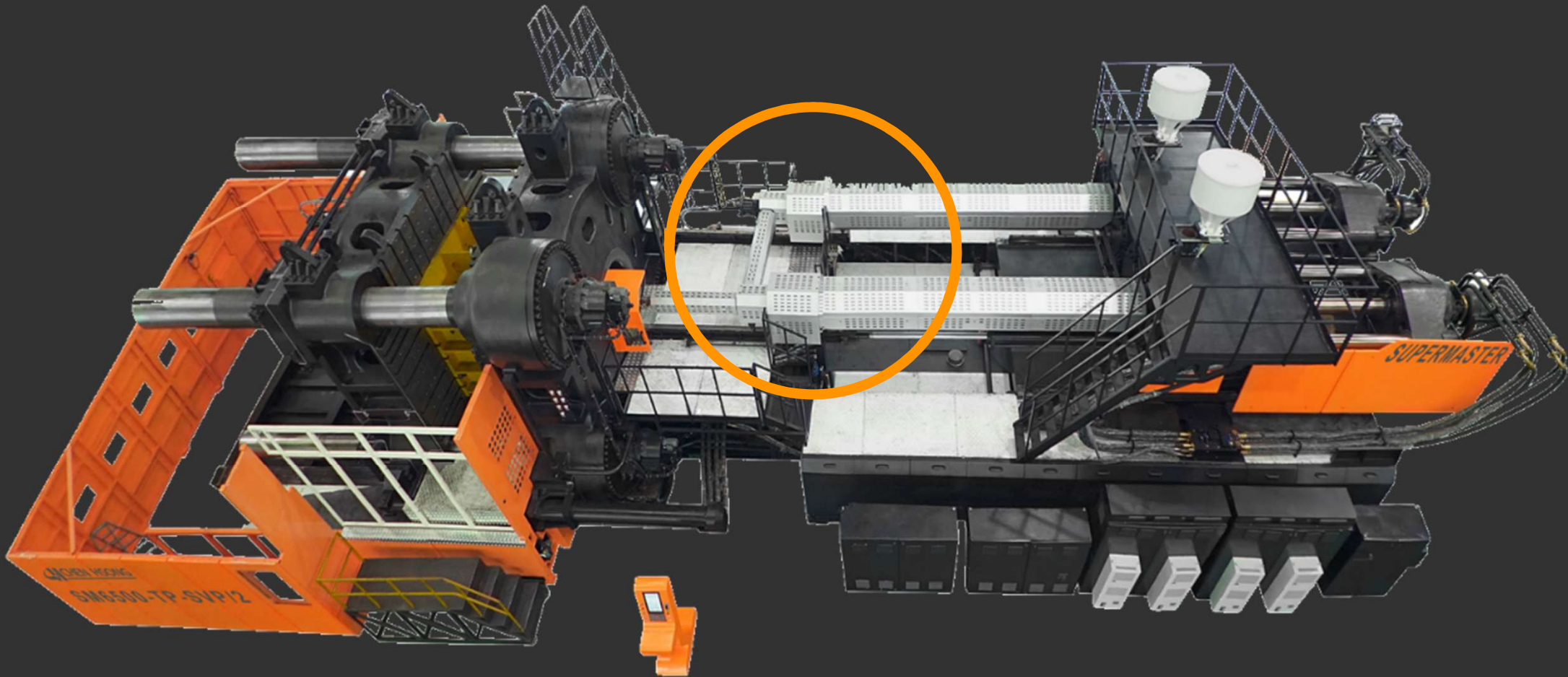
Option

Y-Injectors

or...

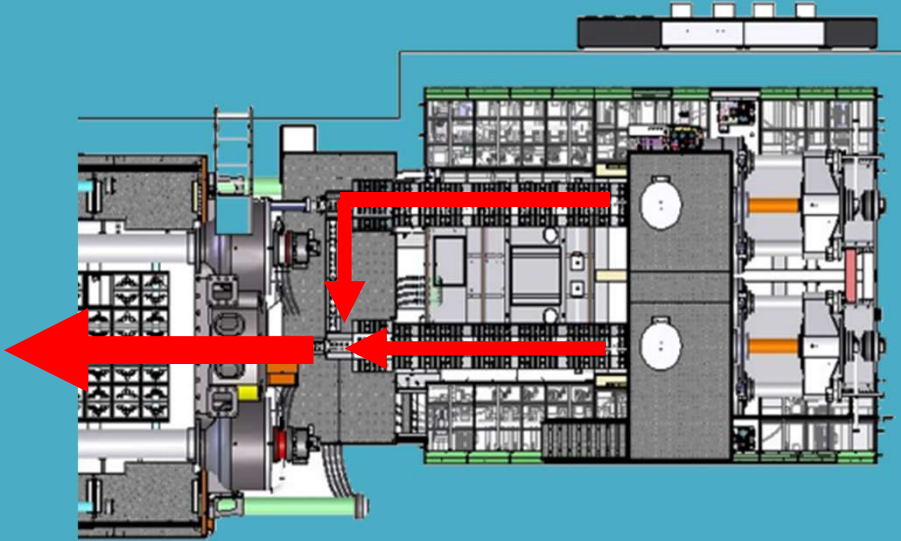
Two is better than one

For very **SMALL** and very **LARGE** parts



Unparalleled Flexibility

- Shoot on one injection unit for **smallest** shot weight
- Shoot on both for **largest** shot weight



Two Injection Units, One Shot!

- Shoot one barrel, then the second
- Shoot both together
- Shoot both, staggered, with different profiles

Two different colors and/or materials..., more than two injectors...

12kg Part on a 120kg Injection Unit!





300µm

Option

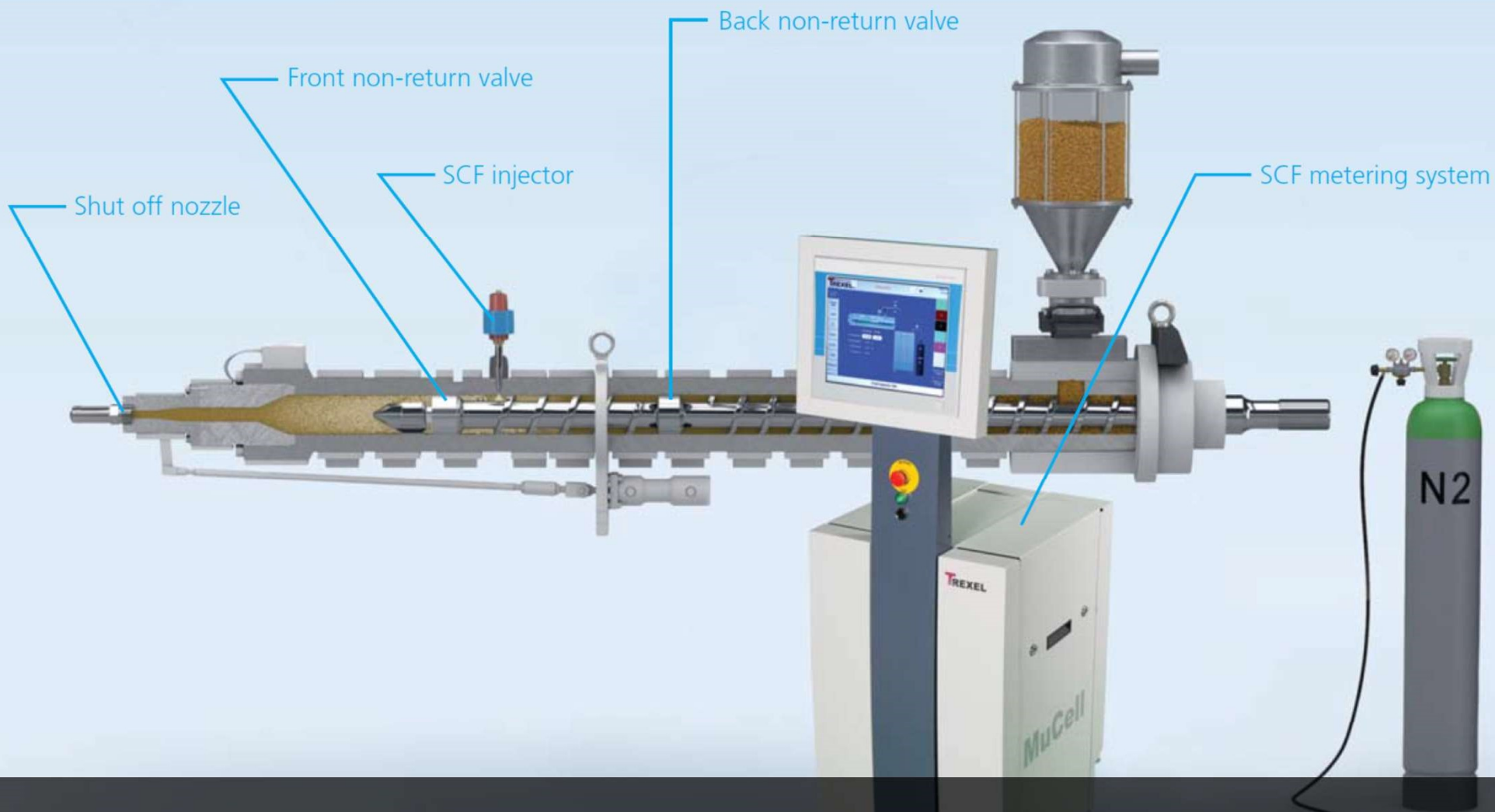
MuCell®

Physical
microcellular
foaming

MuCell[®]

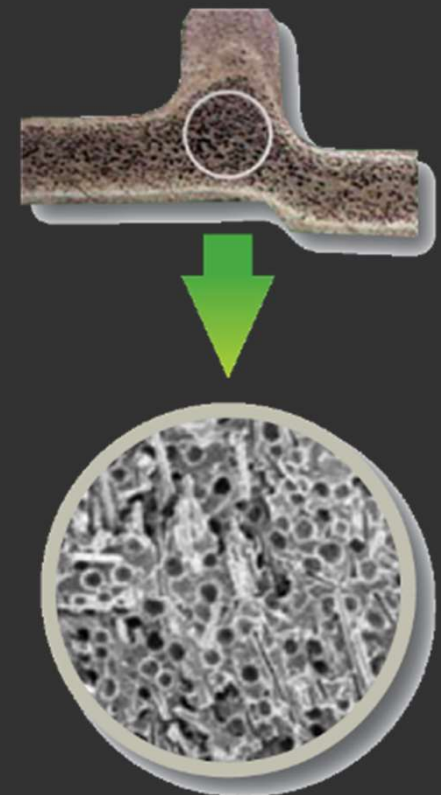
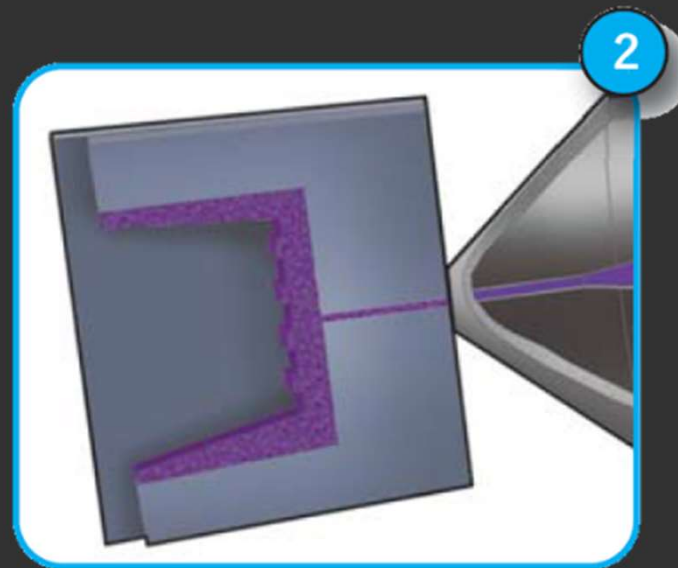
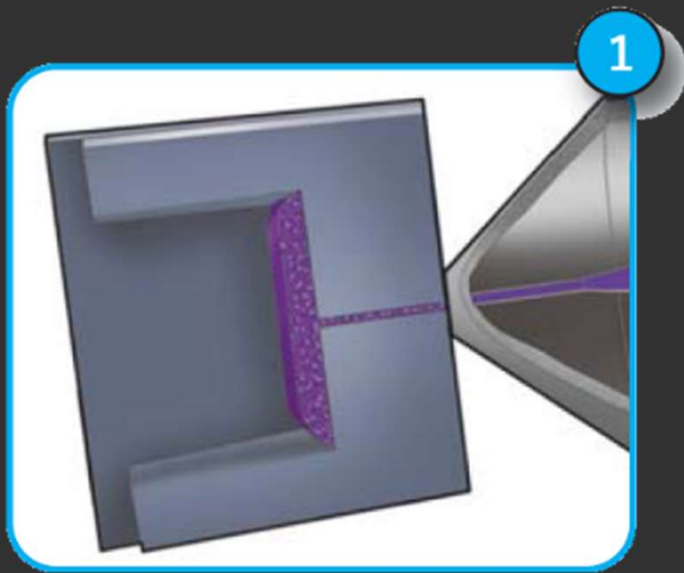
Microcellular Foaming Technology
for Injection Molding Industry





A Typical MuCell® Setup

Microcellular Foaming Principle



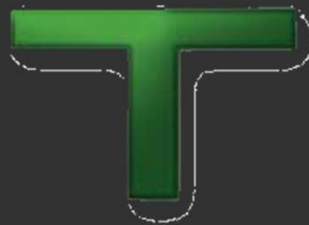
What Can MuCell[®] Do?



Super-large, Super-flat, Super-Long
Large thickness deviation



Traditional

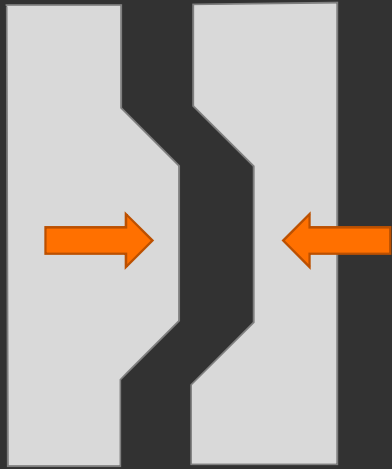


With MuCell[®]

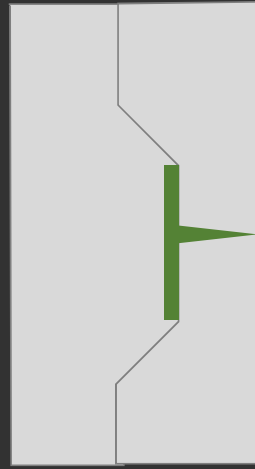


Reduce weight
by 10-15%

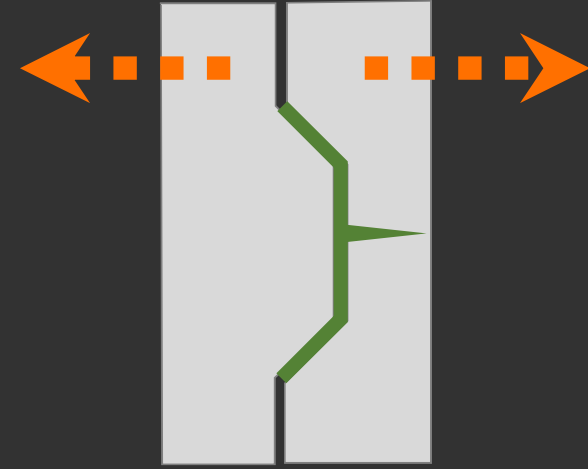
Case: SM3000-TP MuCell® Core-Back
Part: Tesla Model-S Instrument Panel



Clamping



Injection



Core Back

starts opening the mould to
0.5-1mm *during injection*
Precision required: $\pm 0.05\text{mm}$

Precision Hydraulics™



Remember These

Non-Stop™ Technology & Precision Hydraulics®

FAST Cycle and HIGH Reliability

High Energy Efficiency

Unparalleled Flexibility

