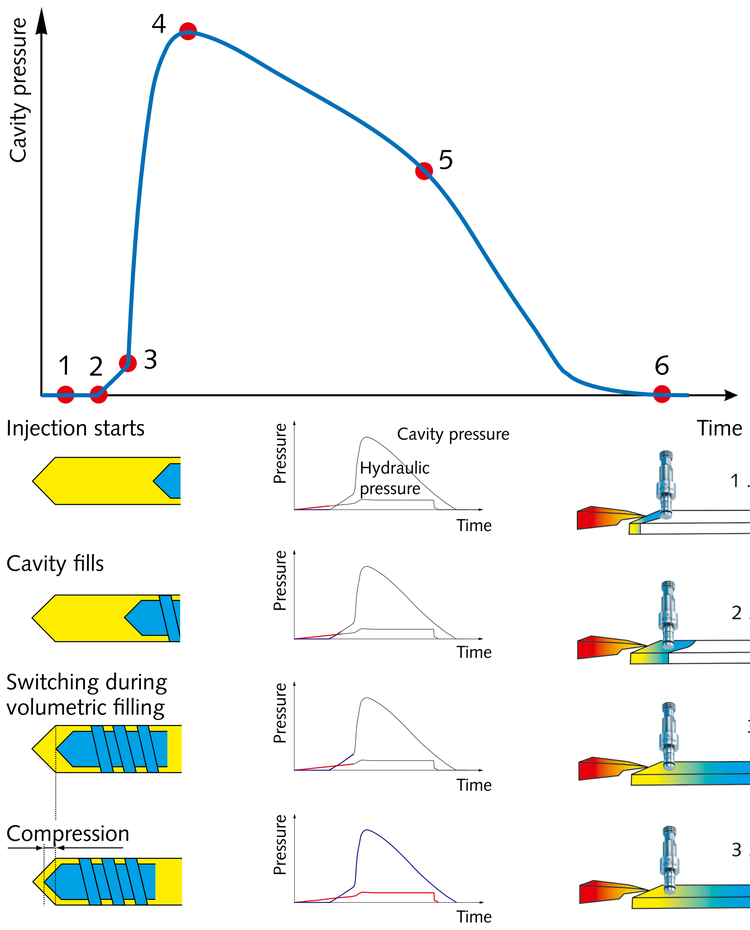
PCS COMPANY
Turn To The Industry Experts

KISTLER
measure. analyze. innovate.

Cavity pressure

Cavity pressure profile



1 **Injection starts**
Hydraulic pressure rises

1 ... 2 **Melt injected into cavity; melt has not yet reached sensor**
No cavity pressure

2 **Melt reaches sensor**
Cavity pressure signal rises

2 ... 3 **Cavity fills**
Cavity pressure rises

3 **Cavity reaches volumetric filling**
Ideal switching to holding pressure

4 **Maximum cavity pressure**
Depends on machine settings, material properties, etc.

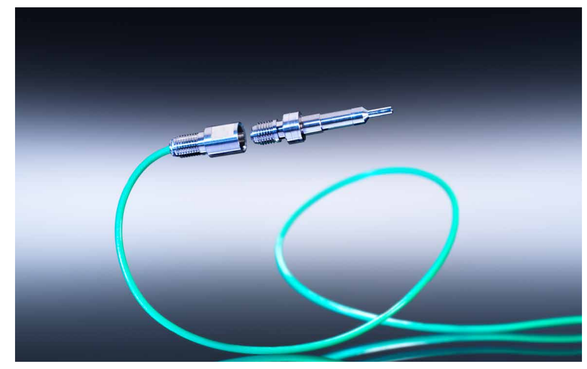
5 **Sealing point**
Melt at gate has solidified so that material cannot flow back out of cavity

3 ... 5 **Melt compresses**
Melt cooling causes volume shrinkage compensation of shrinkage through holding pressure

6 **Atmospheric pressure = processing shrinkage begins**

Recommended sensor position
- In first third of flowpath
- At largest cross section

Sensors for plastics processing



Indirect cavity pressure measurement
Force sensor Type 9210A...
Force sensor Type 9211B...
Force sensor Type 9213B...
Force sensor Type 9204B...
Measuring tongue Type 9223A...
Measuring tongue Type 92221A...

Direct cavity pressure measurement
Pressure sensor Type 6159A...
Pressure sensor Type 6167A...
Pressure sensor Type 6190C...
Pressure sensor Type 6184A...
Pressure sensor Type 6183C...
Pressure sensor Type 6182C...
Unisense pressure sensor Type 6157C...
Unisense pressure sensor Type 6152B...

Process optimization

1 **No indication of errors. High quality parts are expected.**

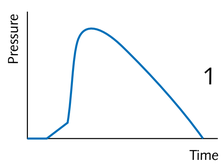
2 **Cavity pressure peak**
- Switching to holding pressure too late (overcharging)
- Injection speed too fast
- Internal stresses, low strength, deformation under conditions of temperature

3 **Pressure release before compression**
- Switching to holding pressure too early
- Uncontrolled filling
- Warpage

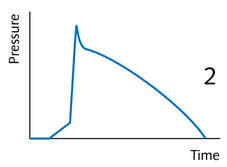
4 **Drop in pressure during holding pressure**
- Holding pressure time too short
- Melt is flowing back
- Sink marks in gate area

5 **Residual pressure**
- Mold too weak or switching to holding pressure too late
- Deformation of die plates during injection phase
- No relaxation after solidification of melt

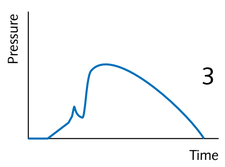
Optimized cavity pressure curve (amorphous)



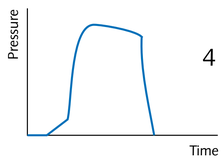
Switching too late



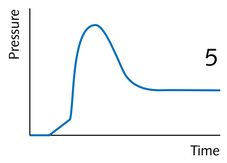
Switching too early



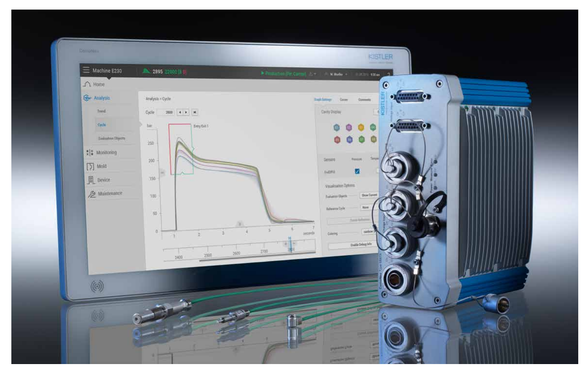
Holding pressure time too short



Residual pressure



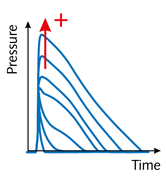
Monitoring system



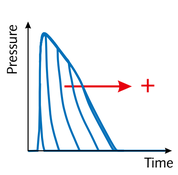
ComoNeo Type 5887...

Effect of various parameters on cavity pressure

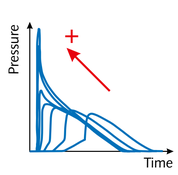
Holding pressure



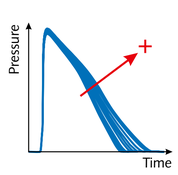
Holding pressure time



Injection speed



Mold temperature



Greatest effect on part quality

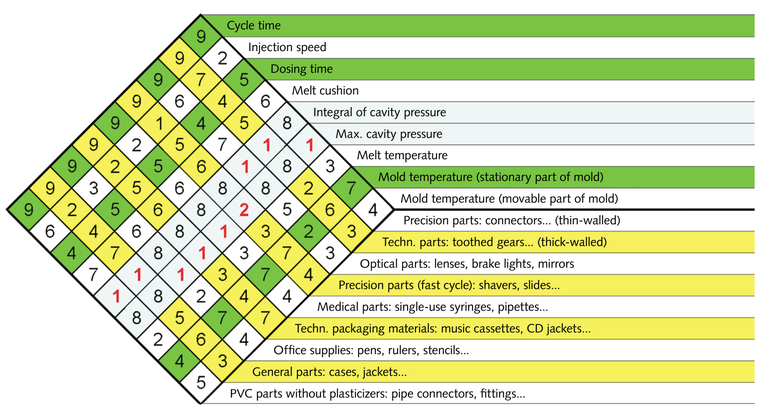
Cavity pressure is the most significant variable in injection molding

Monitoring of maximum value for cavity pressure
- Thin-walled parts with short cycle times

Monitoring of cavity pressure integral (area under curve)
- Thick-walled parts with long cycle times

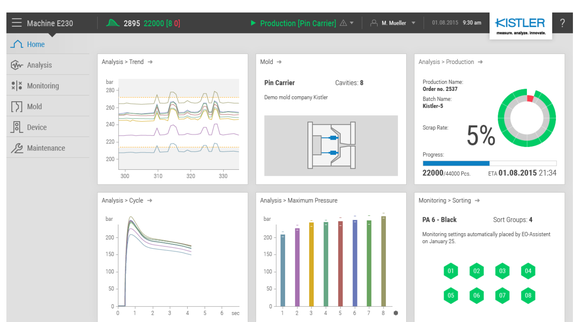
The status of the injection-molded part is reflected directly in the cavity pressure curve. Every process change caused by fluctuating process conditions can be identified with the cavity pressure curve.

1: Maximum effect on part quality / 9: Minimum effect on part quality



Source: Demag, German

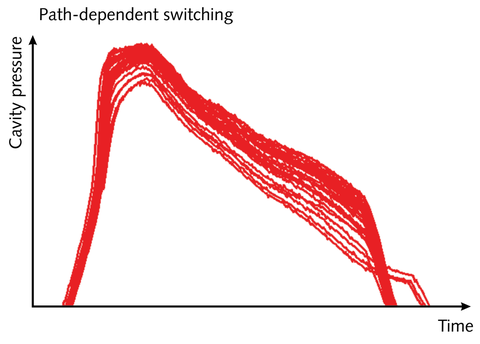
Software and systems for data acquisition, monitoring and control

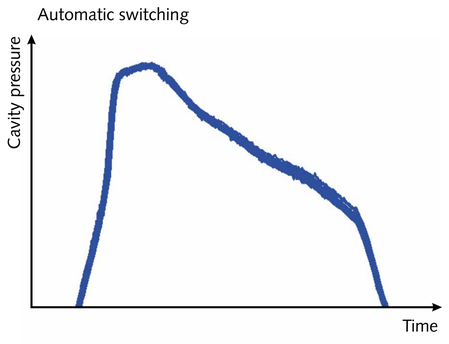


ComoNeo Type 5887...

Automatic switching point identification

- Compensation of viscosity fluctuations
- Compensation of process fluctuations
- High process stability





Charge amplifier with automatic switching point identification

Type 5159...

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