15 Annex

15.1 Units used

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Name</th>
<th>Physical quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ω</td>
<td>Ohm</td>
<td>Resistance</td>
</tr>
<tr>
<td>KΩ</td>
<td>Kiloohm</td>
<td>Resistance</td>
</tr>
<tr>
<td>MΩ</td>
<td>Megaohm</td>
<td>Resistance</td>
</tr>
<tr>
<td>W</td>
<td>Watt</td>
<td>Power</td>
</tr>
<tr>
<td>min.</td>
<td>Minute</td>
<td>Time</td>
</tr>
<tr>
<td>s</td>
<td>Second</td>
<td>Time</td>
</tr>
<tr>
<td>°C</td>
<td>Degree Celsius</td>
<td>Temperature</td>
</tr>
<tr>
<td>K</td>
<td>Kelvin</td>
<td>Temperature</td>
</tr>
<tr>
<td>°F</td>
<td>Fahrenheit</td>
<td>Temperature</td>
</tr>
<tr>
<td>mm</td>
<td>Millimeter</td>
<td>Length</td>
</tr>
<tr>
<td>m</td>
<td>Meter</td>
<td>Length</td>
</tr>
<tr>
<td>“</td>
<td>Inch</td>
<td>Length</td>
</tr>
<tr>
<td>psi</td>
<td>Pounds per square inch</td>
<td>Pressure</td>
</tr>
<tr>
<td>bar</td>
<td>Bar</td>
<td>Pressure</td>
</tr>
<tr>
<td>Nm</td>
<td>Newton meter</td>
<td>Torque</td>
</tr>
<tr>
<td>Foot-pounds</td>
<td>foot pounds</td>
<td>Torque</td>
</tr>
</tbody>
</table>

Glossary and List of Abbreviations

A
activeGate®
activeGate® technologies are designed to facilitate perfect surface quality, stability and repeatability of injected molded parts by precisely controlling the flow. Elements of the activeGate® Control Systems are synflow, eGate, DynamicFeed, hGate, nuGate, VMI Monitoring.

Actuator cooling
See Temperature control of the Hot Runner System

A - Dimension
Distance between the top of the spacer plate and the top of the manifold

API nozzles
See section 2.1.1

APT nozzles
See section 2.1.2

B
Balancing
Processing optimization, consisting in the determination of optimum parameters for the Hot Runner System and the injection molding machine.

C
Cavity
Hollow space in the injection mold in the shape of the molded parts. It is filled with plastics during the injection process.

Cavity plate
Internal space of the injection mold in which the cavity is located.

Clamping plate
Steel plate used to attach the mold to the injection molding machine. The QCVG actuator is placed inside the clamping plate.

Coolant
Cooling fluid used to cool down the actuator. The coolant used should be properly modified, e.g. filtered water with an anti-corrosion and frostproof agent.

Cutout / cavity
Cutout (matrix) into which the Hot Runner System is incorporated. Also mold cavity, or cutout for the nozzle.
# Annex

<table>
<thead>
<tr>
<th><strong>D</strong></th>
<th>Dimension A</th>
<th>See A-dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E</strong></td>
<td>eGate®</td>
<td>Equipment for valve gate systems to realize and control electrically a defined open/close and motion/position profile for each nozzle.</td>
</tr>
<tr>
<td></td>
<td>ELA series</td>
<td>Electric operated actuators for valve gate systems</td>
</tr>
<tr>
<td></td>
<td>EVOH</td>
<td>Ethylene vinyl alcohol copolymer</td>
</tr>
<tr>
<td></td>
<td>Expansion gap Z</td>
<td>See dimension z</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>F0 point</td>
<td>F0 point is the nozzle reference point. The nozzle tip may be cut to this point, but not beyond.</td>
</tr>
<tr>
<td><strong>G</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## H

- **HB Hydraulic Actuator series**
  - The HB Hydraulic Actuator series is available with optional thermocouple, valve pin position sensor and SynCool3.
- **Heated inlet bushing**
  - (see: Inlet bushing, heated)
- **Heater**
  - Resistor element heating the Hot Runner System.
- **High-temperature assembly paste**
  - Temperature resistant assembly paste which enables resolvability of all threads.
- **Hot half**
  - Hot Runner System including the applicable cavity plates. They are already complete with cables, or hoses, fully assembled and ready for mounting.
- **Hot Runner manifold**
  - Steel block distributing the plastic. It forms the Hot Runner System together with nozzles, actuators, supply hoses and heating.
- **Hot Runner System**
  - Hot runner system, see section 2
- **HR manifold**
  - Hot runner manifold
- **HRC**
  - Hardness Rockwell Cone
- **Hydraulic operating fluid**
  - Operating fluid for hydraulic actuators that complies with requirements under classification 21/18/13 pursuant to ISO 4406.
- **HYC series**
  - Hydraulic operated actuators for valve gate systems

## I

- **Inlet bushing, heated**
  - Hot runner nozzles where the contact surface for the machine nozzle is located directly on the nozzle head – either as a manifold or as a single nozzle.
- **Inlet bushing, unheated**
  - Short inlet bushing – in some cases heating is not necessary.

## J

- **J-Type temperature sensor (thermocouple)**
  - Temperature sensor (thermocouple), type J.

## K

## L

- **List of adjustment values**
  - Sheet with values for the optimum setting of the injection molding machine and the Hot Runner System.
- **Dimension L**
  - The nominal dimension between the nozzle face (support ring nozzles) respectively the bottom of the manifold (threaded nozzles) and the F0 point.
- **Dimension Lc**
  - Depth of center support in mold plate
- **Dimension Lcs**
  - Length of center support
- **Dimension Lsp**
  - Spacer ring length
- **Dimension Lms**
  - Support pad length

## M

- **Machine**
  - Injection molding machine
- **Manifold V-37**
  - Manifold 37 mm (1.46") thickness and a width of 36 mm (1.42")
- **Manifold V-42**
  - Manifold 42 mm (1.65") thickness and a width of 50 mm (1.97")
- **Manifold V-45**
  - Manifold 45 mm (1.77") thickness and a width of 50 mm (1.97")
- **Manifold V-50**
  - Manifold 50 mm (1.97") thickness and a width of 60 mm (2.36")
- **Manifold V-55**
  - Manifold 55 mm (1.97") thickness and a width of 80 mm (3.15")
- **Manifold V-65**
  - Manifold 65 mm (2.56") thickness and a width of 80 mm (3.15")
Annex

Manifold VH
Manifold 80 mm (3.15") thickness and a width of 87 mm (3.43")

Manifold VI
Manifold 85 mm (3.35") thickness and a width of 97 mm (3.82")

Manifold channel
Drilled channel in the manifold that conveys the melt.

Mold temperature control
Mold heating or cooling using a fluid pump or similar control unit.

Material safety data sheet (MSDS)
Contains data typical for a specific plastic, such as processing temperature, specified health and safety information etc.

N
Nominal dimension
See Dimension L

O
Open (thermal gate) system
System without a moving valve pin, with thermally controlled gate.

P
PB Pneumatic Actuator series
The PB Pneumatic Actuator series is available with optional thermocouple, valve pin position sensor and SynCool®.

Plastification unit
Screw and barrel of the injection molding machine

Plate actuation
Plate actuation is a synchronized needle opening and is ideal for high cavitation molds.

PLUG’N PLAY® Hot Runner System
The PLUG’N PLAY® hot runner system is supported by the thrust pads, center support and positioning dowels. It is not screwed to the cavity plate. The system can be assembled without adjustment.

PNC series
Pneumatic operated actuators for valve gate systems.

PPE
Personal protective equipment

Pre-chamber isolation
The nozzle tip does not pass through the cavity plate and is located in a pre-chamber. The plastic in the pre-chamber isolates the melt flow.

Q
QCVG
“Quickcouple valve gate” actuator, placed inside mold plate.

R
Ra
Mean roughness value, surface roughness after machining

S
Screwed (threaded) manifold nozzles
Hot runner nozzles screwed into the manifold.

Single valve gate nozzles
Single valve gate nozzles are hot runner nozzles with the inlet bushing directly mounted on the nozzle head. The Single Valve Gate System closes the nozzle tip using a moving valve pin.

Sprue bushing
Hot runner nozzles sprue bushing are hot runner nozzles with the inlet bushing directly mounted on the nozzle head.

Support ring nozzles
Support ring nozzles are hot runner nozzles whose connection to the manifold consists of a face fit, so that during heating the thermally expanding manifold can "slide" over the nozzle heads.

Spacer plate
Steel plate in which a cutout for the Hot Runner System is located.

SynCool®
The SynCool® technology provides passive actuator cooling which may eliminate the need for dedicated cooling lines. It also allows the operator on certain applications at <280°C operating & <80°C mold temperature, to switch off the complete system including the mold and actuator cooling without the risk of decomposing the hydraulic oil.

synflow®
synflow® equipment enables valve pin opening velocity and intermediate pin holding control for hydraulic valve gate hot runner systems.

T
Temperature control of the Hot Runner System
Cooling and heating of the Hot Runner System, maintaining temperature within a specified range.

Temperature controller
Temperature control of the machine

Temperature sensor (thermocouple)
Sensor that measures temperature in specific heated zones of the Hot Runner System, allowing temperature control. Synventive Hot Runner Systems use almost exclusively J type sensors, unless specifically requested by the customer.

Temperature sensor (thermocouple), type J
Temperature sensor whose (+) cable is made of ferrous metal and (-) cable of copper and nickel.

Torque table
List of torques for Synventive parts. See section 13

U

V
Valve gate system
System that closes the nozzle tip using a moving valve pin.

VP series
Pneumatically controlled actuators located in mould plate.
Annex

W

X
Dimension x1  Depth of the center support in VC/VD Manifold

Y

Z
Dimension z  Expansion joint Z on manifolds with support ring nozzles due to thermal expansion. If set correctly, it creates the seal between the nozzle face and the manifold.

15.2 Patents

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EU Patents: 1218161, 1223018, 1223019, 1223020, 1295693, 1810812, 2328735, 2501533, 2504145, 2519392, 2550144, 2620266, 2631059, 2744636, 2888091, 2900449, 2925503, 2931491, 2996432, 2996858, 3013549, 3003680, 3003681, 3092115, 3019323, 3148767, 3209476, 3271129, 326777, 3271130, 3240666, 3247545

CN Patents: CN100406232C, CN102149528B, CN1205013C, CN102770257B, CN1391512A, ZL20051072806.2, ZL201080030322.0, ZL201080060140.8, ZL201180040206.1, ZL201180040565.7, ZL201280075053.9, ZL201280075135.3, ZL201380056480.0, ZL20138005840.5, ZL201380066328.8, ZL201380069040.5, ZL201410693084.1, ZL201480009037.9, ZL201480034175.2, ZL201480039036.9, ZL201480039033.5, ZL201410424996.9, ZL20151005814.9, ZL201480049316.8, ZL201480034180.3, ZL201480016087.x, ZL201480077490.3

CA Patents: 2385016, 2390267, 2663872, 2671300

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