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<td>20</td>
</tr>
</tbody>
</table>
Faster, higher output, more economical – these are in brief the market requirements placed on pipe extrusion plants. These coincide with our principles in plant development. There is a reason for Battenfeld being the market leader in pipe extrusion plant production.

Our customers benefit from the competency in the manufacture of complete extrusion lines and also from the know-how in the development of intelligent automation solutions.

The functions of all plant elements are harmonised and equipped with efficiently operating automation systems. We supply technology meeting highest requirements for you to be able to produce the best possible quality.
OUR CONTROL SYSTEMS
BMC offers:
- Central and efficient operation
- Reproducible production
- Documented quality
- Automation of the entire machine line

TELE-MAINTENANCE
The Battenfeld tele-maintenance provides the fastest support of the operating personnel worldwide in diagnosis, optimisation of process parameters and malfunction remedy. Production downtime is minimised because the knowledge of our qualified personnel is directly available on site.
CONTROL SYSTEM

Well arranged and comfortable: the easily configurable control surface in combination with the stepped automation concept ensures efficient working in all areas of pipe extrusion.

The integration of system extensions, such as dosing systems, co-extruders, melt pumps and an intelligent sensor system in the central control system is possible without problem. The control system is complemented by its network integration and tele-maintenance.

STEP II IN AUTOMATION

The efficiency of the system can even be increased by the integration of an intelligent gravimetric sensor system. One main and up to five secondary components per extruder are easily possible. In addition, the weight per meter of the product is kept constant at all times by a stabilised mass throughput and the slaved take-off speed.

STEP III – IV IN AUTOMATION

The integration of ultra-sonic measuring chambers implies further advantages in pipe production, as product monitoring and documentation are notably improved and manual centring simplified. Optionally, thermal centring tools can be implemented in the automation process. Last but not least, the possibility of minimum wall thickness regulation generates a further reduction in material consumption.
GROOVED HAUL-IN BUSH

For the extrusion of polyolefine pipes in par-
ticular, the Battenfeld extruders are equip-
ped with a grooved haul-in bush. In this
manner, combined with a barrier screw
particularly high plastification outputs are
achieved at an excellent homogeneity of
the melt.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>220 - 240</td>
<td>370 - 400</td>
<td>540 - 580</td>
<td>750 - 800</td>
<td>1100 - 1200</td>
<td>1500 - 1700</td>
<td>2000 - 2300</td>
</tr>
</tbody>
</table>

Performance information depending on pipe dimensions and material type
Battenfeld have set new standards in PVC extrusion by the development of extended processing units. The 28D processing technology is distinguished by its improved product quality, higher output and an enormous processing width.

### Competency

- Compact design
- Maintenance-free screw temperature control
- Heating with ceramic heating bands
- Barrel cooling by means of air blowers
- Stuffer for screw rotational speed reduction
- Screw rotational speed

### Twin Screw Extruder

|---------------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|

Performance information depending on pipe dimensions and material type.
Whether for the transport of water or gas, or for any industrial use, multi-layer Polyolefine pipes convince by their flexibility and variability. In this field, Battenfeld offer a wide range of dies for the realisation of the right answer to every requirement.

**VSI SCREEN DIES**

Lattice basket dies are used for the extrusion of HDPE, LDPE, HMW-PE, PP, ABS and PS.

Advantages:

- Low pressure build-up and low mass temperature, even at high throughputs
- Good homogenisation by the two-stage distribution concept, consisting of a smooth-out thread and a compact lattice basket
- Consistent product quality at all pipe dimensions
- Large processing width based on changed material viscosities
- Short rinsing times through a short dwell time spectrum

<table>
<thead>
<tr>
<th>Type</th>
<th>PO 32/350</th>
<th>PO 63/400</th>
<th>PO 125/450</th>
<th>PO 250/700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>10 - 32</td>
<td>16 - 63</td>
<td>25 - 125</td>
<td>50 - 250</td>
</tr>
<tr>
<td>Max. throughput [kg/h]</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>700</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>PO 450/800</th>
<th>PO 630/900</th>
<th>PO 800/1200</th>
<th>PO 1000/1200</th>
<th>PO 1200/1200</th>
<th>PO 1600/1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>90 - 450</td>
<td>200 - 630</td>
<td>315 - 800</td>
<td>450 - 1000</td>
<td>630 - 1200</td>
<td>710 - 1600</td>
</tr>
<tr>
<td>Max. throughput [kg/h]</td>
<td>800</td>
<td>1000</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
</tr>
</tbody>
</table>

For specification, please refer to the 'technik report'.
MULTI-LAYER DIES

Pipe properties can be optimised in a targeted manner by co-extruding several materials. The correct die depends on the individual application.

Battenfeld develop and produce dies for the most varied co-extrusion applications – optimally matched to the specific product requirements.

RADIAL DISTRIBUTOR WITH SCREEN PLATE

This low-cost die is particularly distinguished by its robust and compact construction design. The additional screen plate improves the distribution and homogenisation of the melt analog to the lattice basket by a double deflection. In conjunction with the proven lattice basket in the main layer, a wide application spectrum is guaranteed at all times.

LATTICE BASKET DIE WITH THREE LAYER SPIRAL MANDREL DIE

While the lattice basket with its known advantages is used for the thicker centre layer, frequently consisting of a low-cost regenerate, the spiral mandrel die finds its application to meet the high requirements of the surface quality for thin inner and outer layers.

FIVE LAYER SPIRAL MANDREL DIE

Meets the requirements for the production of PO hot water pipes.

Advantages:
- Ideal homogeneity and wall thickness distribution of all 5 layers
- Highly compact tool design
- Relatively short flow paths from the extruder to the die exit
For sensitive PVC materials, Battenfeld counts on flow-optimised spider dies and double spider dies. Both die types guarantee uniform melt distribution throughout the entire pipe circumference in an ideal manner.

### SPIDER DIES

For PVC processing, the geometric die design offers the following advantages:

- Very good flow properties throughout the entire flow channel
- Ideal dwell time spectrum with targeted temperature guidance of the sensitive material

<table>
<thead>
<tr>
<th>Tipo</th>
<th>PVC 63/250</th>
<th>PVC 125/400</th>
<th>PVC 160/600</th>
<th>PVC 250/700</th>
<th>PVC 355/900</th>
<th>PVC 450/1000</th>
<th>PVC 710/1300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>12 - 63</td>
<td>20 - 125</td>
<td>50 - 160</td>
<td>75 - 250</td>
<td>110 - 355</td>
<td>160 - 450</td>
<td>315 - 710</td>
</tr>
<tr>
<td>Max. throughput [kg/h]</td>
<td>250</td>
<td>400</td>
<td>600</td>
<td>700</td>
<td>900</td>
<td>1000</td>
<td>1300</td>
</tr>
</tbody>
</table>

For specification, please refer to the "technik report".
FOAM CORE PIPE ADAPTER

The sophisticated concept of the co-extrusion adapter permits the production of weight-reduced foam core pipes as well as pipes with a compact centre layer made of low-cost reclaim. The pipes are shaped as usual by a conventional PVC spider die.

The special design of the adapter permits optional operation with one or two co-extruders for the compact inner and outer layer.

DOUBLE SPIDER DIE

The PVC double spider dies are a further development offering the following advantages:

- Low pressure build-up
- Higher volume within the die
- Larger dimensional range
- Higher throughputs
- No continuous spider die marks
- Better mechanical properties

<table>
<thead>
<tr>
<th>Double spider dies</th>
<th>For specification, please refer to the 'technik report'.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td><strong>Pipe diameter [mm]</strong></td>
</tr>
<tr>
<td></td>
<td>16 - 110</td>
</tr>
<tr>
<td></td>
<td>725</td>
</tr>
</tbody>
</table>
VACUUM CALIBRATORS and SPRAY COOLING BATHS

SINGLE/DOUBLE CHAMBER VACUUM CALIBRATORS

A new generation of vacuum calibrators with convincing features:

- Patented fast vacuum regulation
- Precise temperature guidance
- Flow optimised pipework made of stainless materials
- Vacuum limiter
- Cold water temperature control
- Circulation and vacuum pumps
- Double filter unit

SPRAY COOLING BATHS

Performance features:

- Circulation pump
- Filter with manual return via bypass
- Temperature control via thermostat valve in the water supply
- Central water drain
- Temperature display
- Water collector at the intake and outlet

Vacuum calibrators and spray cooling baths

<table>
<thead>
<tr>
<th>Type</th>
<th>V 63 VA - 6m</th>
<th>V 125 VA - 6m</th>
<th>V 250 VA - 6m</th>
<th>V 500 VA - 6m</th>
<th>V 630 VA - 6m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>10 - 63</td>
<td>20 - 125</td>
<td>40 - 250</td>
<td>90 / 140 - 500</td>
<td>110 / 140 - 630</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>V 800 VA - 6m</th>
<th>V 1000 VA - 6m</th>
<th>V 1200 VA - 6m</th>
<th>V 1400 VA - 6m</th>
<th>V 2-1600 VA - 12m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>200 / 400 - 800</td>
<td>200 / 450 - 1000</td>
<td>315 / 630 - 1200</td>
<td>315 / 630 - 1400</td>
<td>710 - 1600</td>
</tr>
</tbody>
</table>

For specification, please refer to the 'technik report'.
The right **CALIBRATION SLEEVE** for every application

Battenfeld supplies calibration inserts for all technical plastic materials.

Advantages:
- Excellent heat conductance
- High wear resistance
- Good glide properties
- High production output

**Calibration sleeves**  For specification, please refer to the 'technik report'.

<table>
<thead>
<tr>
<th>Type</th>
<th>I</th>
<th>II</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>PVC, ABS, PS</td>
<td>HDPE</td>
<td>PO, PS, PA</td>
<td>PP, PE-MD/LD</td>
<td>HDPE</td>
</tr>
<tr>
<td>Diameter [mm]</td>
<td>10 - 1000</td>
<td>32 - 110</td>
<td>bis 32</td>
<td>ab 32</td>
<td>110 - 1600</td>
</tr>
<tr>
<td>Cooling principle</td>
<td>Intensive cooling</td>
<td>Intensive cooling, adjustable water ring</td>
<td>Disc calibration with pre-chamber; optional: spray ring</td>
<td>Intensive cooling, adjustable glide cooling</td>
<td>Dry inlet and spray cooling</td>
</tr>
</tbody>
</table>
The suitable take-off for every requirement:

Battenfeld offers:

— Belt take-off units for small PO pipes at high production speed

— Caterpillar take-off units predominantly for PVC pipes of a small to medium diameter

— Multiple caterpillar take-off units for thin-walled and larger pipes

MULTI-MOTOR TECHNOLOGY

As far as drive systems are concerned, Battenfeld count on an ultra-modern technology consisting of a digital controller and a separate AC servo drive at each caterpillar. In this manner, the take-off speeds can be precisely synchronised. The system is characterised by the following performance criteria:

— A mechanical power distribution is no longer required

— Improved efficiency

— Optimisation of the production safety

### Multiple caterpillar take-off units

<table>
<thead>
<tr>
<th>Type</th>
<th>R 125/3+1 VE</th>
<th>R 125/4</th>
<th>R 125/3 VE</th>
<th>R 250/4</th>
<th>R 250/6</th>
<th>R 500/4</th>
<th>R 500/6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>10 - 125</td>
<td>20 - 125</td>
<td>32 - 125</td>
<td>20 - 250</td>
<td>50 - 250</td>
<td>50 - 500</td>
<td>75 - 500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>R 630/5</th>
<th>R800/6</th>
<th>R 1000/8</th>
<th>R 1400/10</th>
<th>R 1600/10</th>
<th>R 2000/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>75 - 630</td>
<td>160 - 800</td>
<td>250/500 - 1000</td>
<td>500 - 1400</td>
<td>300/700 - 1600</td>
<td>500/1000 - 1600</td>
</tr>
</tbody>
</table>

For specification, please refer to the ‘technik report’. 
**DOUBLE CATERPILLAR AND BELT TAKE-OFF UNITS**

- Precise synchronised run by AC servo drives
- Parallel guidance of the oscillating top belt/caterpillar at the front side
- Pneumatic contact pressure by double cylinders
- Belt take-off units for high extrusion speeds of >25 m/min

**MULTIPLE CATERPILLAR TAKE-OFF UNITS**

The multiple caterpillar take-off units are suitable for almost all pipe diameters.

Advantages:
- Wide segments
- Long contact length
- High take-off forces

### Belt take-off units
For specification, please refer to the ‘technik report’.

<table>
<thead>
<tr>
<th>Type</th>
<th>P 50 BVE</th>
<th>P 100 BVE</th>
<th>P 160 BVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>10 - 40</td>
<td>10 - 63</td>
<td>10 - 110</td>
</tr>
</tbody>
</table>

### Salidas de oruga dobles
Tome las especificaciones del informe técnico.

<table>
<thead>
<tr>
<th>Type</th>
<th>R 50 SE</th>
<th>R 100 SE</th>
<th>R 160 SE</th>
<th>R 250 SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>25 - 63</td>
<td>25 - 90</td>
<td>25 - 125</td>
<td>32 - 250</td>
</tr>
</tbody>
</table>
Battenfeld offer their customers cutting devices meeting all requirements. Our range encompasses upstroke saws, planetary cutters and saws through to automatic pipe cutters.

### PLANETARY SAWS

Performance features for circulating saws and cutters:

- PVC pipes, chip removing cutting and bevelling on one or both sides
- PVC foam core pipes, chip removing bevelling first, followed by cutting without chips
- PO pipes, chip removing cutting with a special saw blade
- Depending on the design, the saw carriage is equipped with a pneumatic drive or a servo drive

#### Planetary saws

For specification, please refer to the "technik report".

<table>
<thead>
<tr>
<th>Type</th>
<th>STU 125</th>
<th>STU 250</th>
<th>STU 500</th>
<th>STU 800</th>
<th>SU 1000</th>
<th>SU 1400</th>
<th>SU 1600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>20 - 125</td>
<td>40 - 250</td>
<td>75 - 500</td>
<td>160 - 800</td>
<td>250 - 1000</td>
<td>300 - 1400</td>
<td>300 - 1600</td>
</tr>
</tbody>
</table>
PLANETARY CUTTING DEVICE

Performance features for PE and PP pipe cutting without chips:

- Pneumatic saw carriage advance: Basic equipment for jaw clamping
- Guide conveyor in the infeed as a roller table, in the outfeed as a V channel, central, mechanical height adjustment, light design up to 40 mm wall thickness
- Integrated PLC control system/operation

AUTOMATIC PIPE CUTTER

- Fast conversion to a different pipe dimension and cutting techniques
- Almost no-noise cutting process
- Cutting of PO pipes without chips
- Chip removing cutting and bevelling of PVC pipes
- Cutting without chips and chip removing bevelling of PO pipes

**Planetary cutting device** For specification, please refer to the ‘technik report’.

<table>
<thead>
<tr>
<th>Type</th>
<th>TU 125</th>
<th>TU 250</th>
<th>TU 500</th>
<th>TU 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>0 - 125</td>
<td>16 - 250</td>
<td>50 - 500</td>
<td>110 - 800</td>
</tr>
</tbody>
</table>

**Automatic pipe cutter** For specification, please refer to the ‘technik report’.

<table>
<thead>
<tr>
<th>Type</th>
<th>RTA 63</th>
<th>RTA 125</th>
<th>RTA 250</th>
<th>RTA 500</th>
<th>RTA 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>10 - 63</td>
<td>20 - 125</td>
<td>50 - 250</td>
<td>90 - 500</td>
<td>250 - 800</td>
</tr>
</tbody>
</table>

UPSTROKE SAWs

- Pneumatic saw blade advance vertically upward
- Efficient chip extraction
- Saw hood with integrated clamping above the saw table

**Upstroke saws** For specification, please refer to the ‘technik report’.

<table>
<thead>
<tr>
<th>Type</th>
<th>SPR 63 P</th>
<th>SPR 63 E</th>
<th>SPR 125 P</th>
<th>SPR 125 E</th>
<th>SPR 125 H</th>
<th>SPR 250 P</th>
<th>SPR 250 E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. pipe diameter [mm]</td>
<td>63</td>
<td>63</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>
A Battenfeld construction series of belling machines covers all fields of application. Heating and forming methods adapted to the most varied pipe materials not only guarantee a consistently high product quality, but also an optimal output matched to each extruder. Pipe stackers and bundling devices round up the range with regard to an economical and highly productive extrusion.

**NEW HEATING SYSTEM AWI PLUS** (Pat. pend.)

- Substantial reduction of the heating time
- No thermal deterioration of the pipe
- Absolutely uniform pre-heating
- Operating temperature reached within one second
- High energy saving

- **PVC pipes**
  9 machine types from 10 to 1200 mm

- **PE and PP pipes**
  5 machine types from 32 to 630 mm

- **RIEBER sealing ring**
  5 machine types from 50 to 1200 mm

**Belling machines**

For specification, please refer to the ‘technik report’.

<table>
<thead>
<tr>
<th>Type</th>
<th>K 70/2 A</th>
<th>KM-D 125 A</th>
<th>KM-D 160 A</th>
<th>KM-D 250 A</th>
<th>KM-D 50/0</th>
<th>KM-D 650 A</th>
<th>KM-D 800 A</th>
<th>KM-D 1000 A</th>
<th>UK 1200 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe diameter [mm]</td>
<td>10 - 75</td>
<td>25 - 125</td>
<td>50 - 160</td>
<td>50 - 250</td>
<td>110 - 500</td>
<td>180 - 630</td>
<td>180 - 800</td>
<td>280 - 1000</td>
<td>400 - 1200</td>
</tr>
</tbody>
</table>
Twin strand pipe extrusion is to be recommended itself where high throughputs are to be achieved with small pipe diameters.

Advantages:

- Independent speed control per strand
- Possibility to produce different diameters at the same time
- Twin strand lines with two independently controlled downstream units
Polyethylene is best suited to protect steel pipes from corrosion. Battenfeld offers two extrusion methods for PE jacketing:

- Hose jacketing for smaller pipe diameters
- Hose wrapping is used for larger pipe diameters

**HOSE JACKETING**

For hose jacking, the pre-treated pipe is continuously guided through a cross extrusion die while the melt hose is applied to the pipe by vacuum.

**HOSE WRAPPING**

For hose wrapping, a first extruder extrudes the coupling agent as a film layer, while a second extruder applies the multi-layer PE wrap. A homogeneous compound material is achieved by the high pressure by which the wrapping layers are applied on the pipe surface.