Rollepaal

Sustainable and cost-saving pipe production

www.rollepaal.com

Rollepaal
Pipe Extrusion Technology

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About Rollepaal

Rollepaal is a cutting-edge manufacturer of extrusion machines for PVC, PVC-O and PO pipes. We actively contribute to our customers' success by developing sustainable, cost-saving solutions.

50+
Years

125+
Employees

5000+
Units

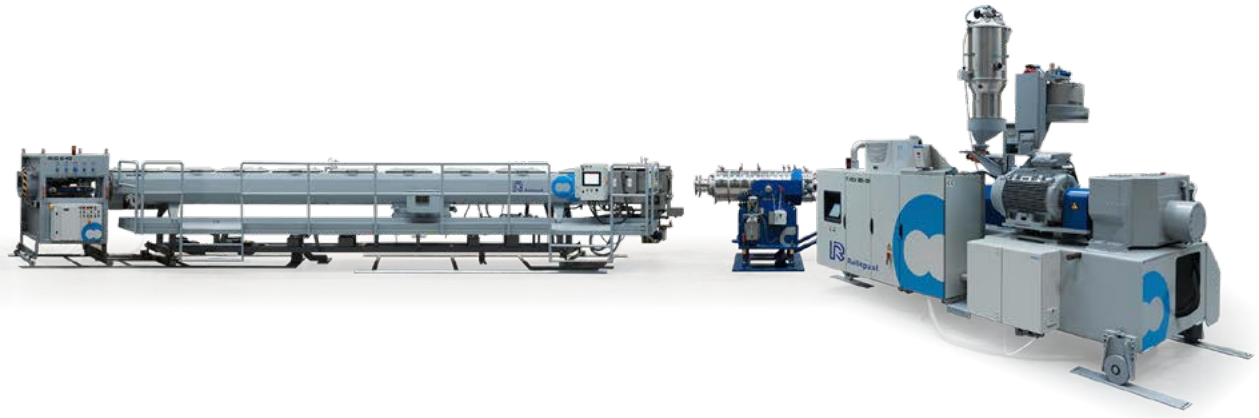
For sustainable and cost-saving pipe production

Who we are
Based on our 60 years of knowledge we build high quality, innovative and cost-effective equipment for the plastic pipe extrusion market.

60 years

Our mission
At Rollepaal our mission is to do our part in seeing that everyone has access to clean water and sanitation by supplying innovative pipe extrusion technology.

How we fulfil this mission
The modern Rollepaal pipe machinery minimises the consumption of raw materials while enabling the use of recycled materials.



PVC-O technology

Although molecularly oriented PVC (PVC-O) has been around for four decades already, it has only been widely accepted since 2006, when the introduction of the international ISO16422 standard and improved technologies increased its popularity. The rise in concern about environmental impact and the demand to produce with a lower carbon footprint makes PVC-O the perfect pipe solution and an interesting technology for potable water application.

There are many advantages of PVC-O compared to non-polymer solutions. Not only the carbon footprint of PVC-O is by far much lower than traditional solutions like ductile iron, but also corrosion, a major problem in ductile iron, is a thing of the past with PVC-O. In short, PVC-O is a much better solution for water pipe installations than PO solutions like PE100.

Rollepaal's PVC-O technology of is an air based in-line technology, a technology that assures you of a reliable process which you can control and adjust at all times.

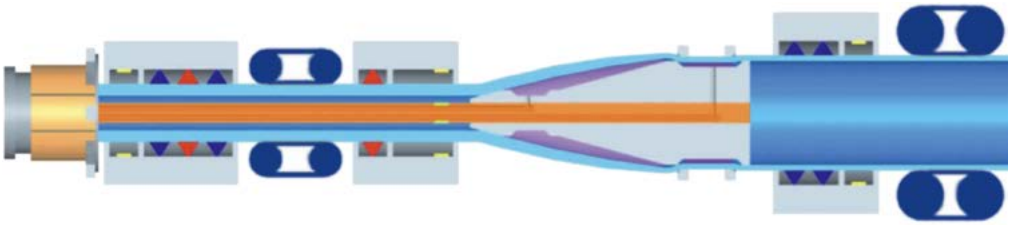
Rollepaal technology is unique in terms of how the pipe is stretched, which is done using compressed air. Because air uses less energy, this makes Rollepaal technology is a cost saving solution.

Why PVC-O?

- Highest impact resistance, also at low temperatures
- Low bending resistance for PVC-O resulting in simple curving of the pipe
- Highest minimum required strength (MRS) class; for PE the highest class is 100 while for PVC-O this is 500! This results in the lowest wall thickness and lowest weight per length
- Best flow properties: PVC-O transports 34% more water than PE, with the same diameter and the same PN class
- Lowest carbon footprint/LC A compared to PE, PVC-U, ductile iron and cast iron
- Proven highest resistance to oxidising media, natural oil based substances and diluted water

Range

From 110 to 630mm

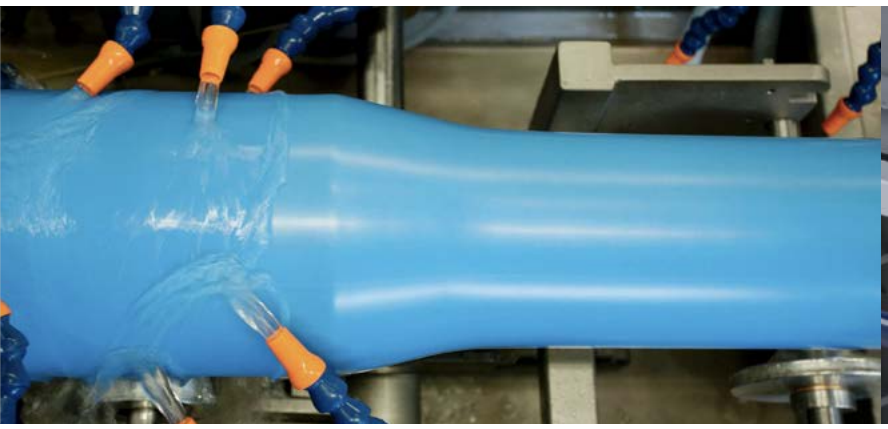


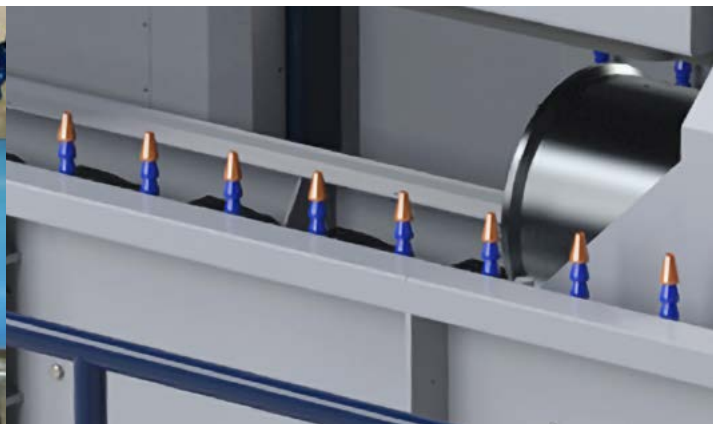
Features and benefits of in-line technology

- Lowest overweight due to integral process control (difference absolute 15% to off-line) resulting from the lowest wall thickness variation in the pipe length
- Quality control of end product: all products are scanned
- Guaranteed controlled biaxial stretching
- Highest production speeds
- Highest automation degree using hands-off principle
- Lowest scrap rates
- Reliable in-line process compared to batch process with cycle time issues
- Extrusion process is part of production
- Different lengths are easy to produce

Features and benefits of the air based process

- Absence of high-temperature water: clean and safe operation
- Lowest scrap rates: because air is easier to heat up, start-up time (heat transfer time) in an air-based system is shorter, meaning quick start up and, with this, lower scrap rates

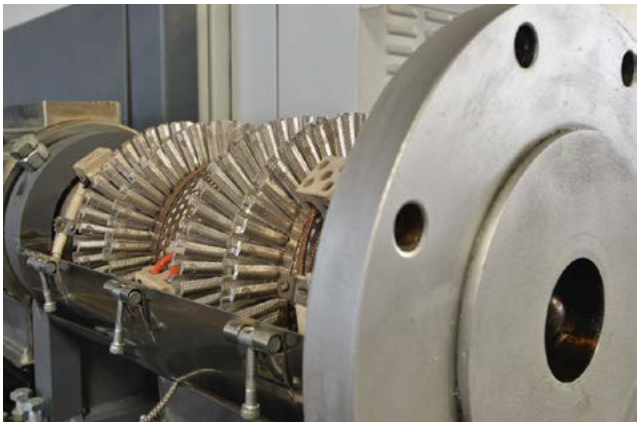




Single Screw Extruders

For PO pipes

Rollepaal offers a complete range of high capacity single screw extruders with a new generation of 40D long screws. The extruders have a large wide processing window for high quality and reliable pipe production.



The new-generation screws provide stable processing with a constant output/rpm ratio. The robust extruders, designed for continuous extrusion of PP and PE pipes, enable your operators to achieve higher productivity along the entire line.

Features and benefits

- Energy efficient extruder
- Wear resistant screw and barrel for a longer service life
- Special designed 40D screw for high output
- Direct motor-gearbox coupled drive unit results in less power loss and less maintenance
- Simple, user-friendly touch screen

Inavex S 60-40

Inavex S 25-24

Product range

Inavex	S 25-24	S 45-40	S 45-40	S 60-40	S 75-40	S 90-40
Maximum output (kg/hr)	5	350	500	800	1200	1800
Effective L/D ratio	24	40	40	40	40	40
Screw diameter (mm)	25	45	45	60	75	90
Motor power (kW)	1.1	90	132	200	300	450

Twin Screw Extruders

Rollepaal offers a wide range of high capacity PVC extruders with screws from 22L/D up to 36L/D, depending on application and output. The twin screw extruders (T-Rex) have a large wide processing window for reliable pipe production with low reject rates. The robust design and controls with proprietary software enable you operators to achieve higher productivity at each stage of the pipe extrusion process.

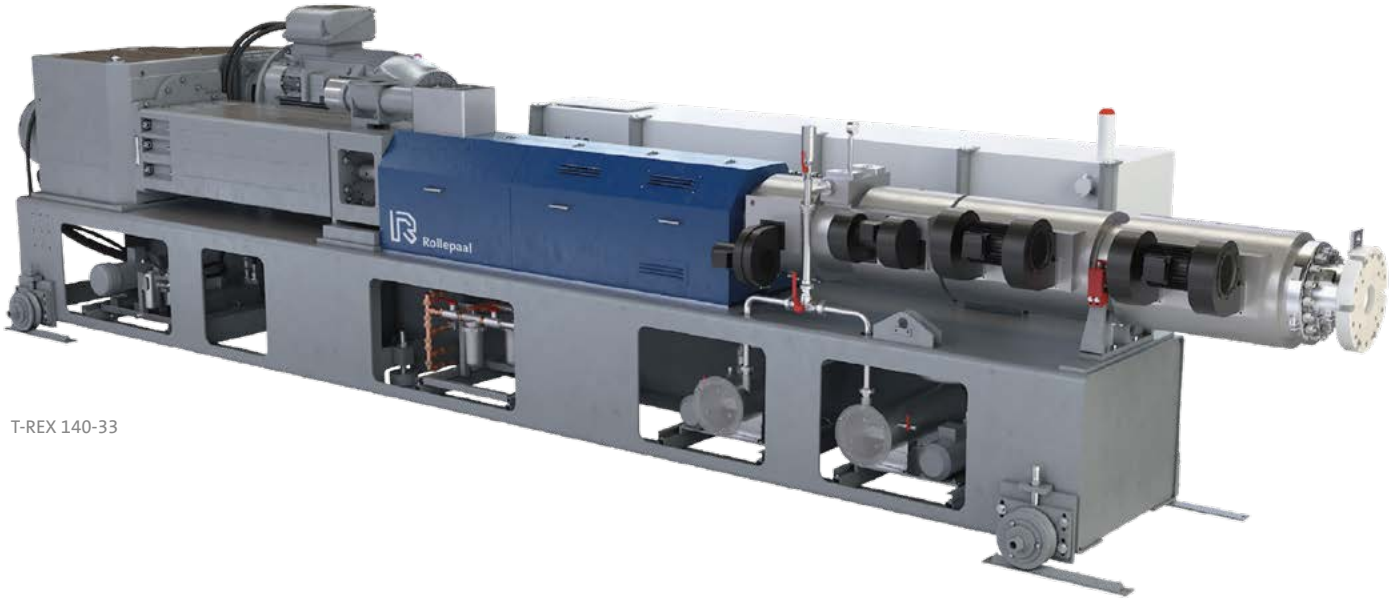
The screw geometry has been developed for a large wide processing window, and in combination with the direct drive concept it provides a higher quality homogeneous melt. The innovative and technological features of the T-Rex extruders result in higher energy savings.

Product range

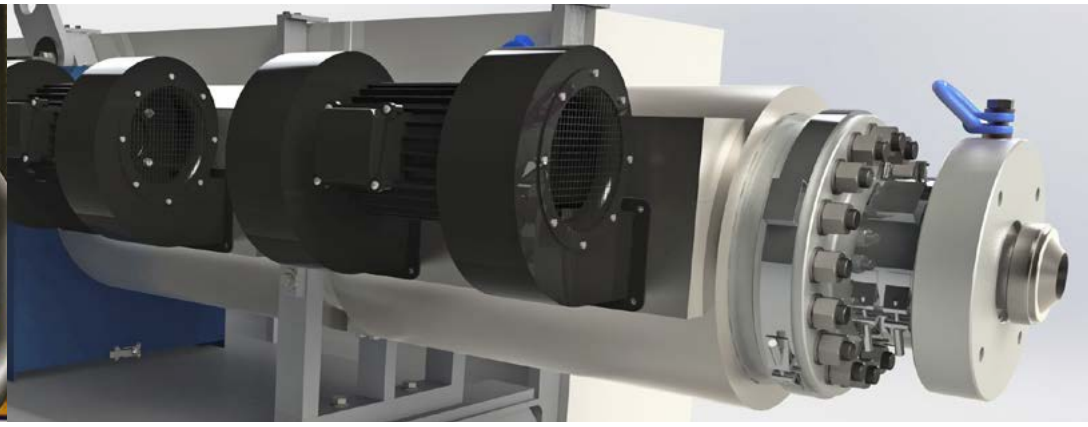
T-Rex	75-22	75-30	75-33	90-30	90-33	105-30	105-36	125-30	125-33	125-36	140-33
Maximum output (kg/hr - lb/hr)	250/ 500	400/ 880	500/ 1100	650/ 1430	800/ 1760	1000/ 2200	1150/ 2530	1100/ 2400	1400/ 3000	1400/ 3000	1800/ 4000
Effective L/D ratio	22	30	33	30	33	30	36	30	33	36	33
Screw diameter (mm)	75	75	75	91	91	107	107	127	127	127	143
Motor power (kW)	25	45	55	75	75	110	110	140	160	160	220

Features and benefits

- Output capabilities of up to 1,800 kg/hr / 4,000 lb/hr
- Improved screw design for a longer effective screw length
- Direct torque control for a more constant screw rpm
- Lower specific energy consumption
- Internal screw cooling
- Air-cooled barrel for more gradual cooling
- Highly efficient direct AC drive
- Windows-based controls, reducing training requirements
- Recipe storage for enhanced reproducibility



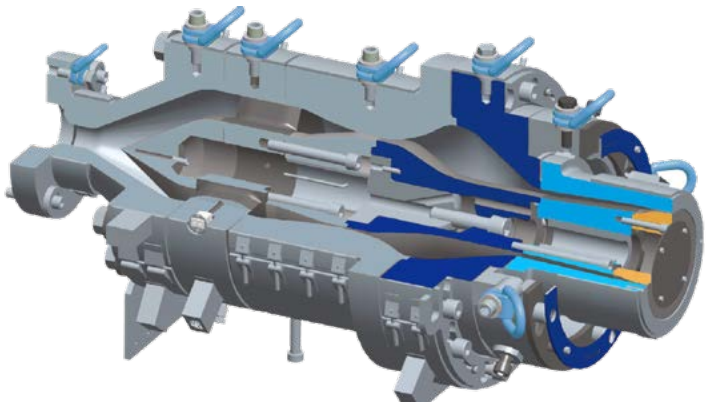
T-REX 140-33



Solid Wall Die Heads

Rollepaal's years of experience in extrusion has resulted in products that are based on a sound theoretical approach combined with broad practical experience. The Rollepaal Solid Wall Die Head (RSD) is the tried and tested heart of a solid wall PVC pipe extrusion line.

RSD die heads have been computer designed using a calculation program based on a 3D viscoelastic model for plastics. The program calculates the optimum flow lines for compression cones that otherwise would not be feasible for reliable use in production. Rollepaal spider dies reach the highest efficiency possible in terms of raw material consumption. The RSD die heads have also been designed to be robust, easy to assemble and dismantle, and are maintenance friendly.
The flow lines have been optimised for reliable and reproducible production and allow high output and easy to run formulations. As the compression is high, the pipes are smooth without weak spider lines.



Wall thickness	3-6 minutes*	■		
Diameter change	6-12 minutes*	■	■	
Range change	12-20 minutes*	■	■	■

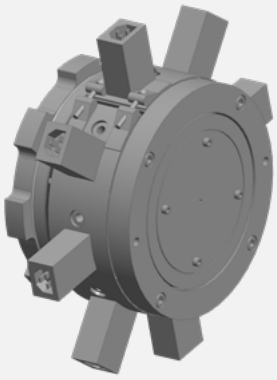
* Changeover times depend on diameter range

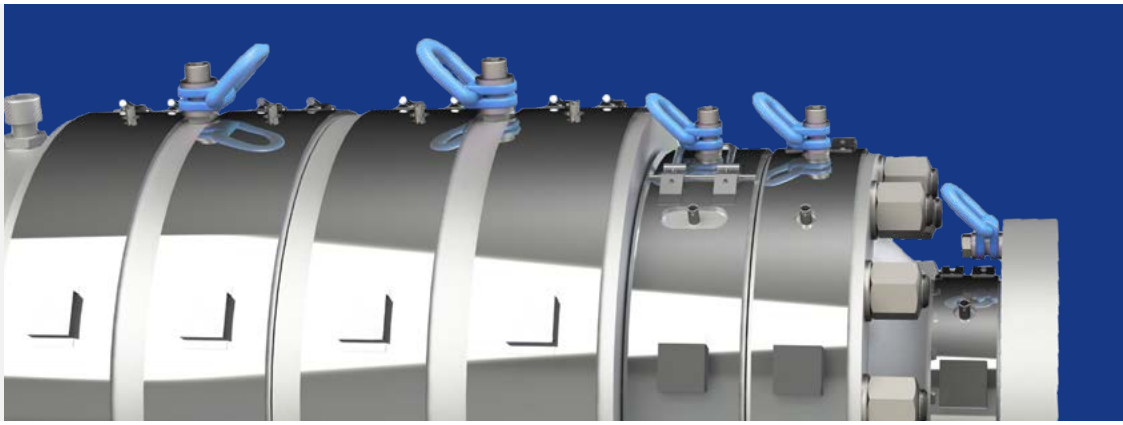
Features and benefits

- Quick tool change - less time changing wall thickness and diameter, available for RSD 2, 4, 6 and 8, >8 easy tool CHACE
- Thermal centring - temperature control zones at the die head for rapid wall thickness adjustments
- Modular design - less tooling required for a larger range of pipe diameters
- A smooth pipe and low overweight at high output
- Designed for runners and variety products
- Minimum tooling for maximum pipe range
- Perfect spider line welding thanks to double compression
- Low inventory allows for lower dry blend stabilisation
- Smart centring - reduce centring time after diameter change (RSD12 and larger)

Product range

	Ø = inch				2				4		6		8	10		12		16		20		24		32	40	48
Type	Ø = mm	16	20	40	50	60	70	85	90	110	115	160	170	200	250	270	315	325	400	410	500	520	600	630	800	1000	1200
RDSD 2		■	■	■	■	■	■																				
RSD 4			■	■	■	■	■	■	■	■	■																
RSD 6			■	■	■	■	■	■	■	■	■	■	■														
RSD 8						■	■	■	■	■	■	■	■	■	■	■											
RSD 12									■	■	■	■	■	■	■	■	■	■									
RSD 16										■	■	■	■	■	■	■	■	■	■	■							
RSD 20														■	■	■	■	■	■	■	■	■					
RSD 24															■	■	■	■	■	■	■	■	■	■			
RSD 30																				■	■	■	■	■	■		
RSD 48																								■	■	■	■

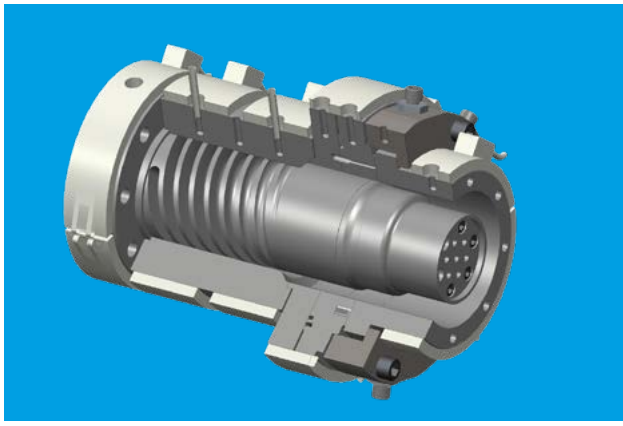




Solid Wall Die Heads

For PO pipes

Rollepaal's Spiral Mandrel Die Heads (RSMD) for PO pipes are characterised by their user-friendly design based on experience gained worldwide. These dies are robust, while still easy to assemble and dismantle. Rollepaal's spiral mandrel design is optimised for reliable and reproducible production, allowing for high output. The proven spiral mandrel design ensures the best layer distribution and low eccentricity.



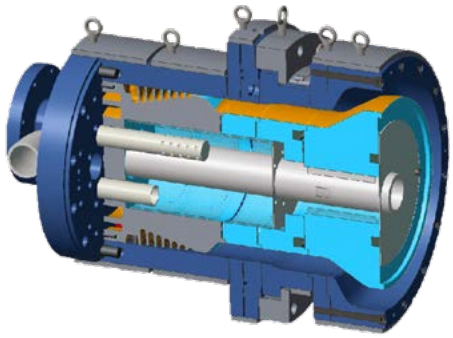
Rollepaal's years of experience in extrusion has resulted in products that are based on a sound theoretical approach combined with broad practical experience. Our RSMD Solid Wall Die Head is the tried and tested heart of a solid wall PO pipe extrusion line. RSMD die heads have been computer designed based on a 3D viscoelastic model for plastics.

Pipe Atmospheric Cooling (standard)

The die head offers the option to draw in air from the end of the pipe (Ø > 125mm) and release the hot air into the atmosphere through the die head later in the process. When a pipe is cooled from the inside, 20% to 30% of the cooling length is reduced, depending on wall thickness. The system consists of a high capacity air blower, air ducts in the die head, a control box for the blower with speed indicator and an air temperature gauge.

Internal Head Cooling (optional)

The internal surface of the die head as well as some of the mandrels can be air cooled. In this system, air is blown into the inner chamber of the die head with the help of a diffuser, after which the hot air is discharged. This system has the advantage of enabling higher output for the larger dies.



Features and benefits

- Pipe size range covers all SDR classes according to standard
- Self-cleaning and short dwell time for material
- Low pressure build up even with high viscosity materials like PE100 and PE100++ thanks to melt flow system
- Addition of 3/4/6/8 colour stripes without dismantling the jockey extruder
- Modular design that works with ADD ON sets without range adaptors
- Quicker die change in horizontal orientation
- Less tooling required
- Increased productivity
- Higher line output or, optionally, a shorter extrusion line
- Better roundness
- Less internal stress
- Less thermal degradation on inner surface

Product range*

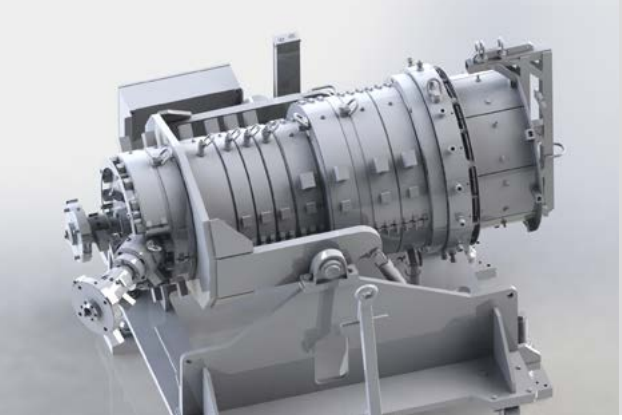
	Ø = mm																								
Type	16	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315	355	400	450	500	560	630
RSMD 6	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■										
RSMD 10		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
RSMD 16									■	■	■	■	■	■	■	■	■	■	■	■	■				
RSMD 24									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

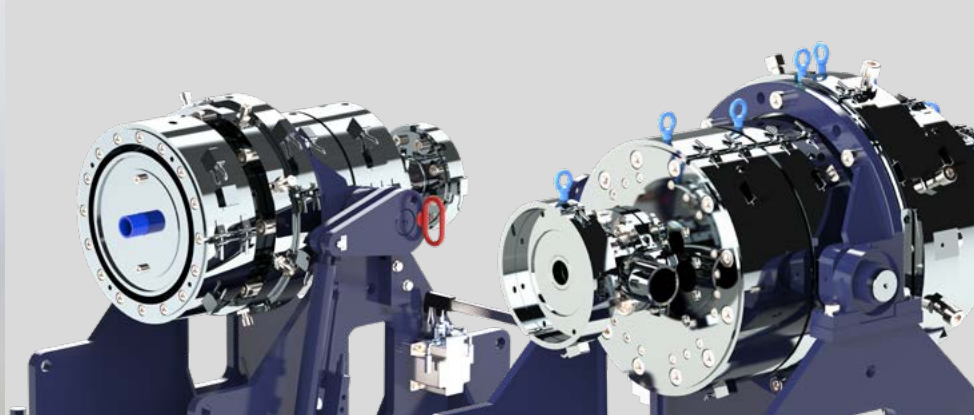
* 2 closer to Standard Dimensional Ratios (SDR) can be processed with one mandrel
Tooling for RSMD 6 / RSMD 10 / RSMD 16 is interchangeable

■ Optional pipe size range can be produced

< RSMD 16 and RSMD 24 are supplied with a hydraulic trolley as standard

> 2 and 3-layer die heads can also be supplied



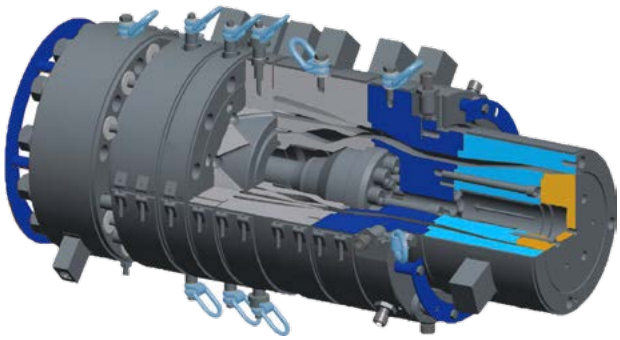


Multilayer Die Heads

A revolutionary idea started the development of the Rollepaal Multilayer Die Heads (RMD). The technology is based on the principle of symmetrical branching of the melt to feed the layers. Symmetry in melt feed guarantees the best layer distribution, because all flow lines have the same length.

The layer distribution is independent of melt viscosity, as there is no need for a melt flow restrictor gap with different lengths around the die circumference for correction. The design features a symmetrical split of short round channels in each disc, preventing the melt from clogging the die head.

Depending on the application and formulation, the RMD die head is provided with either single or double compression tooling. The die head, with modular design, includes Smart Tool Change and Smart Centring. The easily accessible short, round distribution channels make cleaning, when necessary, an easy task.



Wall thickness	3-6 minutes*	■		
Diameter change	6-12 minutes*	■	■	
Range change	12-20 minutes*	■	■	■

* Changeover times depend on diameter range

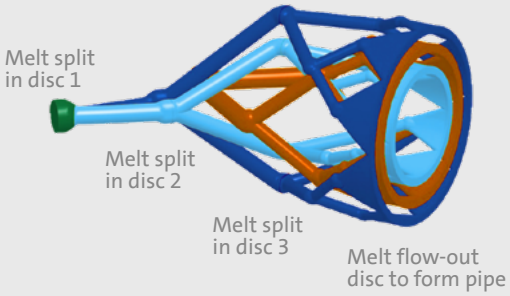
Product range

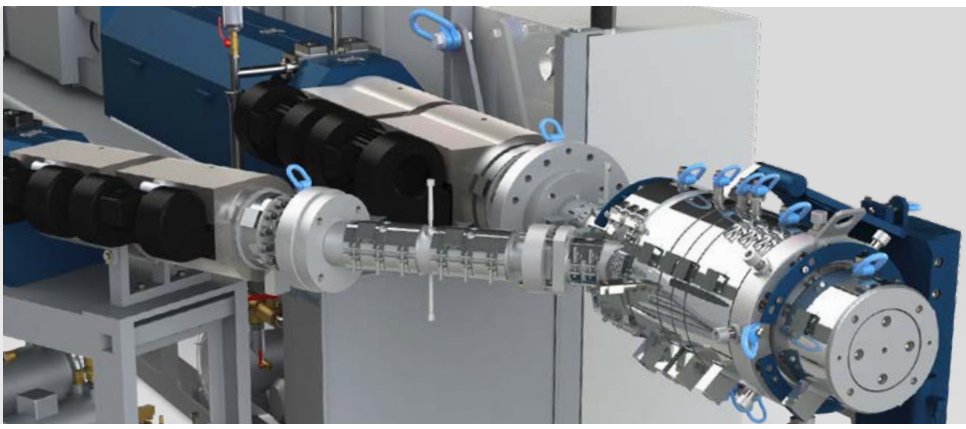
Ø = inch				2		4	6		8	10		12		16		20		24	32
Ø = mm	10	20	32	60	85	110	160	170	200	250	270	315	325	400	410	500	520	630	800
RMD 4		■	■	■	■	■	■	■											
RMD 6/7			■	■	■	■	■	■	■										
RMD 8				■	■	■	■	■	■	■	■								
RMD 12					■	■	■	■	■	■	■	■	■						
RMD 16						■	■	■	■	■	■	■	■	■	■				
RMD 20							■	■	■	■	■	■	■	■	■	■	■		
RMD 24									■	■	■	■	■	■	■	■	■	■	
RMD 32												■	■	■	■	■	■	■	■

Features and benefits

- The die support with hydraulic levelling system and the specially designed cleaning tools make cleaning the die a quick process, keeping down time to a minimum
- Excellent skin distribution to maximise material savings
- Skin-core ratio: best performance in the market
- Outer and inner skin ratio adjustable even with double extruder set-up
- Suitable for foam core and solid wall Foaming K57 + K67 pipe grade virgin and 100% recycled material
- Foaming with addition of minimal processing aid
- 2 and 3 layer version
- Thin coating application for PVC
- Round branched holes, easy to disassemble for quick cleaning
- Special tooling design for optimal foam layer quality
- Optimized production with ATC possibility

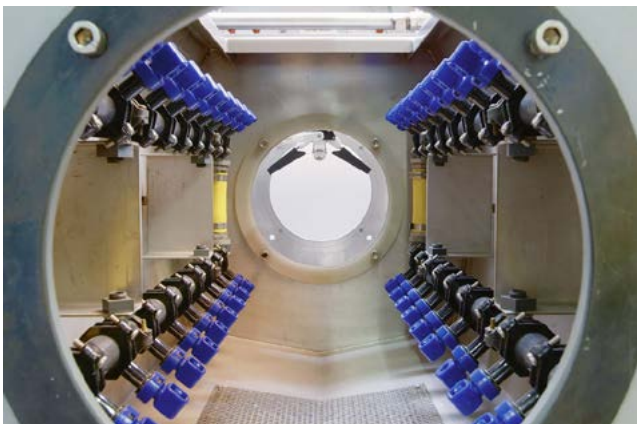
Symmetrical branching





Cooling units

Rollepaal has a complete range of vacuum and spray cooling equipment for pipe diameters from 10 to 1600mm (0.4" to 64"). The controlled environment of the cooling units increases accuracy in the production process.



Rollepaal Vacuum Cooling

Our vacuum cooling tanks meet our customers' highest standards. Whether this concerns improving outputs where cooling length is restricted or critical applications requiring absolute control over vacuum and water temperature, Rollepaal vacuum cooling tanks offer the best performance available. The tanks are manufactured to the highest quality and are designed to be easy to operate, easy to install and easy to maintain. This makes these the favourite choice for both operators and plant managers worldwide.

With cooling tanks that are equipped as standard to meet any challenge, Rollepaal also offers various options to reduce energy consumption, include redundancy and/or incorporate specialised cooling equipment. Upon request the tanks can be customised to fit into any production environment.

Rollepaal Spray Cooling

Stationed behind the vacuum cooling section, the spraying bath cools the pipe further by spraying water on the pipe under atmospheric conditions. Fresh water is supplied to maintain the set temperature level. The water level is kept constant with an overflow outlet.
The spray cooling is intended for use in the daily production environment. The spray cooling chamber is a welded shell, made of V2A stainless steel.

There are multiple aluminium covers with a rubber seal insert on the top. The spray nozzles are fixed alongside the tank. The seals at product feed-in and outlet points adapt to the pipe diameter. Pipes are supported on rollers or disks (depending on the application). The sprayer cooler is supported on a robust welded frame. The height can be adjusted by turning two screws on each console.

Features and benefits

- Standard long-lasting air controlled valves, suitable for contaminated water
- New water level control, not sensitive for contaminated water
- Rigid and sturdy stainless steel construction
- Cost savings thanks to quick tool change design
- Stable vacuum and efficient cooling Highly efficient electric motors Stable water temperature control
- Quick start up as seals maintain vacuum even with non-standard shaped pipe
- CBC-05 control

Product range

RSV Rollepaal vacuum cooling units

	Min. Ø (mm)	Min. Ø (inch)	Max. Ø (mm)	Max. Ø (inch)	Vacuum chambers
2	16	0.63	70	2.75	1 or 2
4	16	0.63	125	5	1 or 2
8	50	2	250	10	1 or 2
16	110	4	410	16	1 or 2
20	160	6	520	20	1 or 2
24	250	10	630	24	1 or 2
30	400	16	800	32	1 or 2
40	560	18	1000	40	1 or 2
48	800	24	1200	48	1 or 2
64	800	32	1600	64	1 or 2

RSC Rollepaal atmospheric cooling units

	Min. Ø (mm)	Min. Ø (inch)	Max. Ø (mm)	Max. Ø (inch)	Vacuum chambers
2	16	0.63	70	2.75	
4	16	0.63	125	5	
8	50	2	250	10	
16	110	4	410	16	
20	160	6	520	20	
24	250	10	630	24	
30	400	16	800	32	
40	560	18	1000	40	
48	800	24	1200	48	
64	800	32	1600	64	

RDV Rollepaal dual vacuum cooling units

	Min. Ø (mm)	Min. Ø (inch)	Max. Ø (mm)	Max. Ø (inch)	Vacuum chambers
2	16	0.63	70	2.75	1
4	10	0.4	63	2.5	1
8	24	1	125	5	1 or 2

RDC Rollepaal dual atmospheric cooling units

	Min. Ø (mm)	Min. Ø (inch)	Max. Ø (mm)	Max. Ø (inch)	Vacuum chambers
2	16	0.63	70	2.75	1
4	10	0.4	63	2.5	1
8	16	0.63	125	5	1 or 2

Scanners

Rollepaal offers a full range of solutions to set and control pipe quality during production. Scanners are used to record pipe dimensions. Rollepaal scanners provide a short loop feedback system, helping to bring the production lines to specification and keeping them there.

The scanners use ultrasonic waves to measure pipe wall thickness. A transducer generates a high frequency wave that penetrates the pipe wall, where it reflects back to the sensor from the inner surface of the pipe. The pipe wall thickness is determined based on the time it takes the waves to travel through the pipe and back to the sensor. The signal is visible on the touch screen display, allowing operators to optimise settings manually through a user-friendly operator interface. Scanners are available as stand-alone units or can be integrated into an existing system.

Rollepaal offers two types of scanners to measure wall thickness: rotating scanners and compact static scanners.

Rollepaal Rotating Scanners - RRS

The RRS scanner is a rotating scanner, which registers 360 points in the pipe circumference. The scanner alternately rotates clockwise and counterclockwise. Because the sensor is in contact with the pipe the system is not affected by pipe surface conditions. The sensor is self-wiping. The system requires a film of water between the sensor and pipe. The scanner is equipped with a touch-screen display that shows the shape of the actual ultrasound echo signal, making the system simple to use.

Rollepaal Compact Scanners - RCS

The RCS is a compact static scanner. The RCS consists of 4, 8 or 16 static ultrasound transducers measuring wall thickness and diameter.

Features and benefits of Rollepaal Rotating Scanners

- Continuous in-line wall thickness measurement
- Self-adapting to the pipe diameter, no diameter related parts
- Manual and automatic calibration capabilities

Features and benefits of Rollepaal Compact Scanners

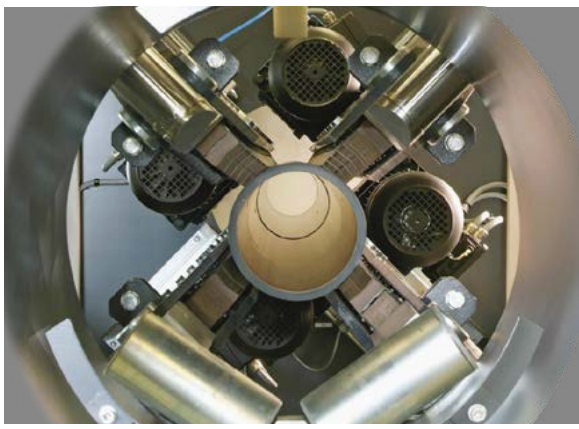
- Continuous in-line wall thickness and outside diameter measurement
- Excellent return on investment
- Reduced start-up time and scrap
- Minimum amount of space required with multiple line interchangeability
- Suitable for solid wall PVC, PE, PP, CPVC and PVC-O pipes
- Optionally available in dual set-up

Product range

Type	Ø = inch	½	1	2	2	4	5	6	8	9	10	12	13	16	18	20	24	32	48	60
	Ø = mm	10	20	50	63	110	125	160	200	225	250	315	325	400	450	500	630	800	1200	1800
RRS 8					■	■	■	■	■	■	■									
RRS 16						■	■	■	■	■	■	■	■	■	■					
RRS 24						■	■	■	■	■	■	■	■	■	■	■	■			
RRS 30										■	■	■	■	■	■	■	■	■		
RRS 48												■	■	■	■	■	■	■	■	
RRS 60																		■	■	■
RCS 2		■	■	■	■															
RCS 4			■	■	■	■	■													
RCS 8				■	■	■	■	■	■	■	■									
RCS 12					■	■	■	■	■	■	■	■	■							
RCS 16						■	■	■	■	■	■	■	■	■						

Haul offs

Rollepaal offers an excellent programme of state of the art haul offs from 6 - 800mm (1/4"- 32"). The haul offs have been designed for accuracy, socketing and ease of use during start-up and production. The wide range of Rollepaal haul offs offers maximum flexibility. The Rollepaal haul offs (RHO) are available with 2, 3, 4, 6 or 8 tracks. The number of tracks depends on the pipe dimension and wall thickness.



A Rollepaal haul off continuously pulls thermoplastic pipe through the cooling line after it comes out of the extruder. The tracks of the haul off are controlled by separate servo motors. Accurate and constant hauling speed is obtained via the servo controller, which maintains a uniform speed for each track; this is important to prevent pipe deformation.

Frame

The steel frame has a robust rectangular shape for high rigidity and is completely enclosed for maximum safety. All electrical equipment, including the control panel, is located on the side panel of the frame. A pipe guide roller is located on the product feed-in side of the haul off. A height adjustment device is mounted on the four lower corners of the frame.

Tracks

The tracks comprise a caterpillar chain covered with profiled, wear resistant, rubber blocks, giving maximum grip without damaging the pipe. Easy electric height adjustment of the lower tracks to pipe diameter. Pipes are clamped to the upper track by means of pneumatic cylinders A separate pressure regulator can be placed on the product feed-in and outlet end

Features and benefits

- Low maintenance
- Very low chain wear
- Quick diameter change
- Independent product feed-in and outlet pressure control
- Extra wide pads
- Long contact length
- Accurate line synchronisation
- Slip control (optional)

Product range

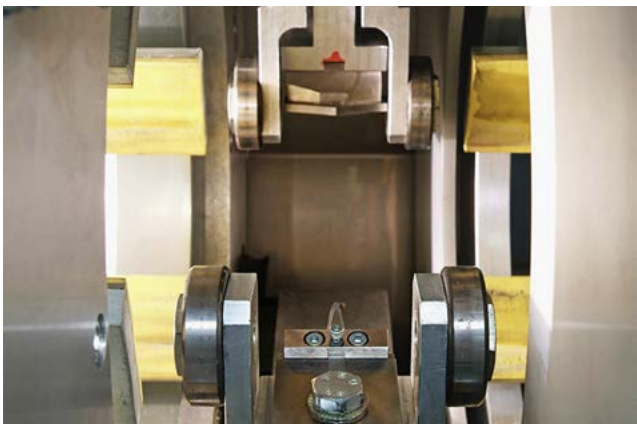
Type	Tracks	Ø = inch	¼		1	2		4	6	9	10	16	20	24
		Ø = mm	10	16	27	50	75	90	100	160	250	315	410	520	630
RHO 2	2T		■	■	■	■	■	■	■						
RHO 6	2T			■	■	■	■	■	■	■					
RHO 6	3T				■	■	■	■	■	■					
RHO 8	4T					■	■	■	■	■	■				
RHO 12	4T						■	■	■	■	■	■			
RHO 16	4T							■	■	■	■	■	■		
RHO 16	6T[2]								■	■	■	■	■		
RHO 20	4T									■	■	■	■	■	
RHO 20	6T[2]									■	■	■	■	■	
RHO 24	6T[1,2]										■	■	■	■	■

[1] Also available in a heavy duty model

[2] Number of tracks used can differ from total number of tracks in the lower diameter range

Cutters

Rollepaal offers a wide range of cutters and chamfering machines (CCM & RCM). Rollepaal cutters run in a range of diameters from 20 to 520mm (3/4"- 20"). The unique design of the Rollepaal cutters incorporate chisel cutting devices that rotate around the pipe, making this a dust-free system.



Cutting & Chamfering Machine - CCM

The CCM is a modular automatic cutting and chamfering machine for plastic pipes with diameters from 32 to 500mm (1 ¼"-20").

Before cutting the pipe, two pneumatically actuated clamp assemblies with four arms each secure the carriage to the moving plastic pipe, ensuring that the carriage moves along at the same speed as the pipe. With this system, the pipe can be cut and chamfered without interrupting the production process. None of the components need to be changed when moving over from one pipe to the next. Tool movement and carriage are controlled by a camdisk.

Rollepaal Cutting Machine - RCM

The RCM is an automatic cutting and chamfering machine for plastic pipes with diameters from 20 to 520mm (3/4"- 20"). The RCM range was designed especially to cut conversion times and cycle time significantly and to ensure smooth ejection of the cutting swarf. The advanced technology ensures uniform cutting and chamfering and makes the RCM relatively insensitive to irregularities in the shape of the pipe. Tool movement is controlled by a camdisk.

A dust-free production of any application and an excellent cut for the socketing device are guaranteed with Rollepaal cutters, as are ease of use, a robust design, and solutions for PP, PE, PVC and high filled materials.

Features and benefits of the Rollepaal RCM

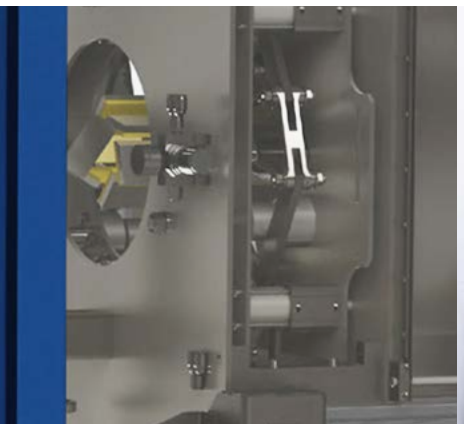
- Multiple cutting lengths in one line
- Optimal cutting speeds mean longer service life of cutting tools
- Faster movement towards the pipe which results in faster cutting
- Most parameter settings displayed on touchscreen

Features and benefits of Rollepaal cutters

- Swarfless and non-swarfless cutting machines
- All movements are electro-mechanically driven (no hydraulics)
- Cutting parameters can be set during production
- Tool change during production
- Use of standard cutting tools
- Low noise level
- Clean and dust-free cut
- Easy operator interface
- Unmatched quality of cutters

Product range

	Pipe diameter				Pipe wall thickness		Maximum line speed*		Shortest pipe length	
	min		max		PVC					
	mm	inch	mm	inch	mm	inch	m / min	inch / min	mm	inch
RCM 4	20	0.8	125	4.9	12	0.5	24	945	200	8.0
RCM 8	25	1.0	225	8.8	20	0.8	16	629	200	8.0
RCM 16	90	3.6	410	16.1	25	1.0	12	472	400	16.0
RCM 20	110	4.4	520	20.4	35	1.3	9	354	500	20.0
CCM 32-170	32	1.2	170	6.7	8	0.3	13.3	523		
CCM 50-250-V	50	2	250	9.8	25	1.0	12	472		
CCM 110-450-V	110	4.4	450	17.7	25	1.0	8	315		
CCM 160-500-V	160	6.3	500	19.7	25	1.0	8	315		



Cost Saving Solutions

Comprising around 80% of the costs, material is by far the largest cost component in plastic pipe manufacturing. This fact makes it worthwhile to reduce overweight and/or increase $CaCO_3$ content, while keeping the pipe to the required specifications. Rollepaal offers several solutions to control the quality of the pipe during production. These solutions are compatible with all existing brands of equipment.

- **Rollepaal Direct Mixing (RDM)**
- **Rollepaal Direct Addition (RDA) - $CaCO_3$**
- **Wall control units (scanners)**
- **Automatic Thermal Centring (ATC)**
- **Gravimetric systems (RGS)**

Rollepaal Direct Mixing (RDM)

The RDM is the next step in processing; PVC resin with the necessary additives can be mixed directly on top of the extruder, meaning no need for a mixing plant. The RDM unit is mounted on the extruder for constant dosing and mixing of materials in an industrial environment. High amounts of $CaCO_3$ can also be added without the problem of segregation. This also saves on energy, as there is no need for hot mixing. Multiple dosing units for additives are mounted, providing optimal flexibility in production.

Features and benefits of Rollepaal RDM systems

- Unique formulation for every application
- Lower carbon footprint
- Instant mixing
- Flexible production
- Low investment to begin PVC pipe production
- Quickly expand capacity
- No mixing plant required
- Lower energy consumption
- A complete solution

Rollepaal Direct Addition (RDA)

The RDA ensures that the addition of material to the PVC powder will be done in an exact and consistent way. The RDA unit is mounted on the extruder for constant dosing of hard to handle materials in an industrial environment. High amounts of $CaCO_3$ can be added without the problem of segregation. This also saves energy, as it does not pass through the hot mixer. Multiple dosing units for additives can be mounted providing optimal flexibility in production.

Features and benefits of Rollepaal RDA systems

- No segregation of $CaCO_3$ and PVC during transport
- Smoother pipe
- Blending energy savings
- Increased flexibility of extrusion line (basic formulation)
- Gravimetric addition of additives
- High output at low reject rates

Wall control units (scanners)

Controlling the dimensions of the pipe during production is an important factor in keeping the pipe to the required specifications. Rollepaal scanners are able to measure pipe wall thickness and diameter*. A range of scanners with various features is available, covering pipe sizes from 10 to1600mm (1/2" - 60") diameter.

Features and benefits of our scanners

- Continuous in-line measurement of wall thickness and diameter*
- Minimum wall thickness control (overweight reduction)

* Static scanners only

Automatic Thermal Centring (ATC)

Rollepaal ATC makes it possible to control the distribution of the wall thickness. The ATC can adjust differences in the wall thickness and thus reduce production line start-up time, pipe overweight and material scrap.

Rollepaal Gravimetric System (RGS)

The core component of the RGS is the weighing hopper. After being filled, the material flows from the weighing hopper into the extruder. The amount of material being fed into the extruder is determined by the loss in weight per unit of time. The extruder output is compared to a set reference value. A control system adjusts the extruder screw speed (or dosing speed) to bring the output to the desired level. This control mechanism keeps the extruder output stable regardless of fluctuations in bulk density of the raw material.

Instead of the output control, the output signal can also be used to control of the haul-off speed, in which case the pipe weight per meter is kept at a constant level. If the line incorporates an ultrasonic scanner, the measured output is used for automatic calibration of the ultrasonic measurement. This eliminates time-consuming manual calibration procedures.

Process Control System (PCS II)

The PCS II itself is a control system that can be combined with a scanner, ATC, RDA and RGS. The type of scanner, ATC and gravimetric system depends on the extrusion line.

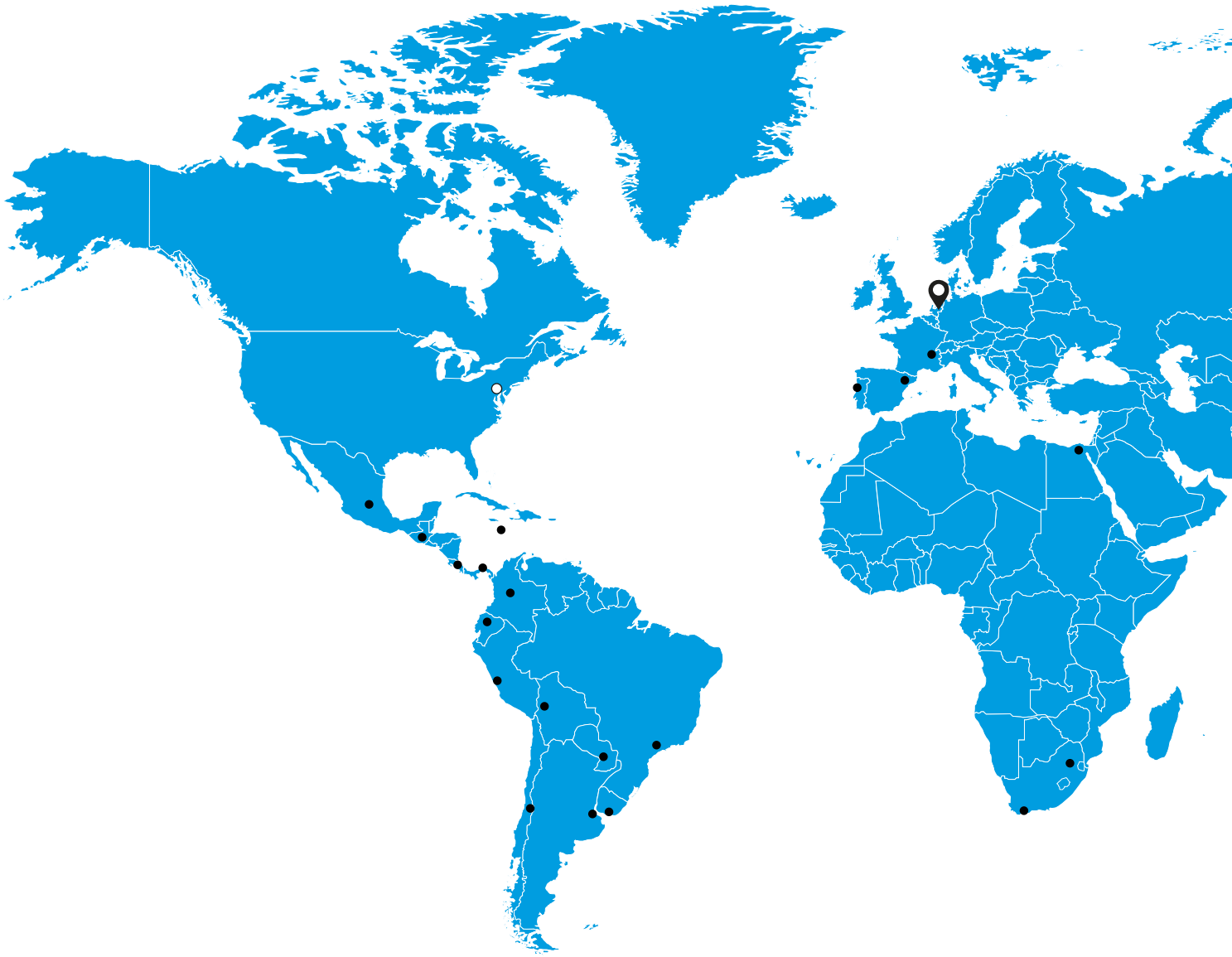
Features and benefits of our cost saving solutions

- Excellent return on investment
- Reduction of start- up time and scrap
- User-friendly interface for total extrusion line control
- Overweight reduction
- Can be used on existing equipment

We are present all over the world

High quality service and quick support are in our DNA; we ensure this through our global presence. Rollepaal has facilities in the Netherlands, USA and India and has dedicated agents all over the world.

Not only do we provide high quality pipe extrusion equipment, we also offer you full support. If you have any questions about pipe extrusion, don't hesitate to contact us.



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