

The largest types of plastic pipe – which are typically used in drainage applications – can be produced at outputs of 3 tonnes per hour. **Lou Reade** reports

Bigger is better: large diameter pipe

It may seem like a case of sheer brute force, but the technology needed to produce large pipe – often more than 2m in diameter – requires sophistication and close control. After all, even a small increase in pipe wall thickness will mean a lot of material is being given away.

Krah Advanced Technologies (KAT) has recently developed new technology to produce large diameter pipes.

It says that the equipment can be used to make structured wall pipes and solid wall pipes at high output – but without sagging problems or frozen stresses.

The company says that its KR800-Max production line has been used to make 1,000mm internal diameter SN8 pipe, at an output of 1,300kg/hour – including co-extruded inner layer with electrofusion and spigot. Also, it was used to make 2,000mm, SDR11 pipe – for pressure or outfall applications – at an output of 1,400kg/hour.

The same machine has been able to extrude a pipe DN/ID2000mm, SDR11, for pressure or outfall application. Also the solid wall had no frozen stresses and no sagging.

The line is based on a single main extruder and co-extruder, with an installed extrusion capacity of nearly 1,600kg/hour, which was designed specially for Krah. Each extruder is equipped with a gravimetric system for two components. It used HE3490LS and HE3492-LS-H materials from Borouge/Borealis as reference materials.

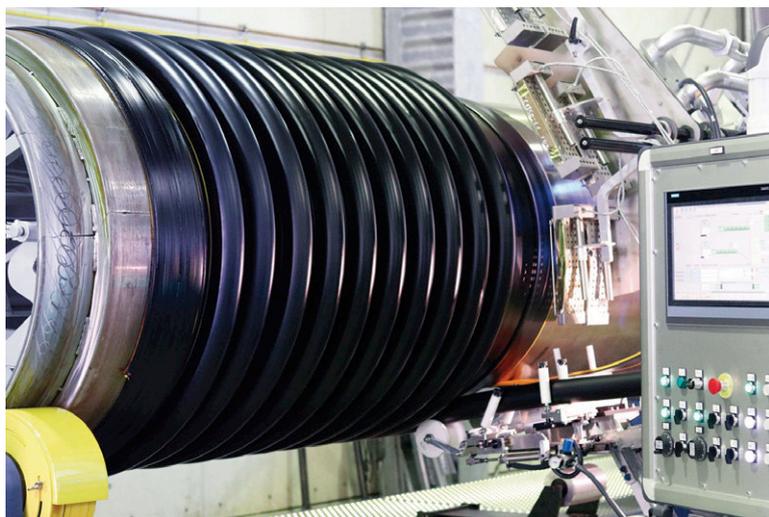
An integrated control system controls and visualises the whole plant. Energy consumption can be monitored onscreen, while a smart reporting and visualisation system displays and saves the exact cost of making each pipe.

Thanks to the new mass distribution valve, the pipe ends are manufactured homogeneously with only one die head (the second will be opened at the required time) – so the start-up waste will be reduced to 3kg.

Another feature of the KR800-Max line is the production of homogeneous solid wall pipes with a wall thickness of up to 300mm, without any sagging problems and with high production output. The plant can produce bi-directionally, and is equipped with energy-saving IR-heating.

The batch process allows the equipment to produce

Main image:
Agru's US arm
is producing
2,500mm HDPE
pipe at a new
facility in South
Carolina



Above: Krah says that its KR800-Max production line has made 2,000mm pipe at an output of 1,400kg/hour

numerous pipe sizes (in various stiffnesses and SDR classes), with changeover times of less than 10 minutes.

Big head

Tecnomatic has designed a special die head that allows the production of polyethylene (PE) pipe up to 2,600mm diameter – with hourly throughputs of 3 tonnes of material.

Each Venus die head features two spiral distributors, and is fed by two extruders. High output extruders are limited in their availability and reliability, says Tecnomatic, which is why it designed the pipe heads to work with two single-screw extruders. In this arrangement, both extruders should have high capacities, identical size and be equipped and synchronised with an accurate dosing system to ensure correct weight control.

This procedure increases line productivity and ensures fast pipe turnaround times due to increased production capacity, says the company.

Its Venus 1600 and 2600 pipe heads are designed to process PE100 material. Each pipe head has two spirals inside, with the same geometry. The system is comparable to a co-extrusion die, says Tecnomatic.

The melt distribution system is short in length and low in volume, ensuring short residence times. A gap in the centre allows air exchange inside the pipe at high volume.

Melt feed points are horizontally positioned and allow a parallel arrangement of the extruders – leaving enough space for the ducts of the pipe air cooling

system. Thanks to the new spiral geometry design, low pressure and high melt distribution is achieved, while the inside heating/cooling unit ensures uniform temperature control and distribution.

The Tecnomatic die-heads, for large diameter pipes, are compact and short in length and the working system is based on a swelling production process. Properly sized die-sets allow also an easy and quick disassembling and cleaning.

The main advantages of two-spiral die head technology include: high output; low material shear at high output; ideal temperature distribution inside the head, thanks to an optimal tempering system; short head dimension; smaller basic head – and bigger die – to make the volume low and residence time short; and, inner pipe air cooling.

A key point of the project was to boost output rate at lower melt temperatures and power consumption. This has been achieved by using a spiral grooved feed bush and improvements in screw design. The new feed bush ensures minor friction, commonly generated by raw material transport. Developments in the screw design – with optimisation and enhancement of torque and shearing elements – have improved the output while allowing the material to be processed at lower melt temperatures.

Using two extruders in the Zephyr series, in size 75 or 90, allows the production of pipes at rates up to 3,000kg/hour.

World first

Agru has claimed a world first by installing PE100 pipe – with outside diameters of 1,200 and 1,400mm – using horizontal direct drilling (HDD).

The Agruline PE pipelines were installed trenchless, in a twin-pipe culvert underneath the River Spree in Germany. The pipe is used to transport groundwater – as well as water from a nearby open cast coal mine.

These pipes were originally made from GRP, but these had undergone complex repair – and could, at a later date, suffer further damage. As the coal mine can only operate for a few days without the pipeline – which is used to lower the water table – the switch was made to PE100.

A new installation using HDD with pipes made from PE 100-RC was the most economic and easiest solution to imple-

