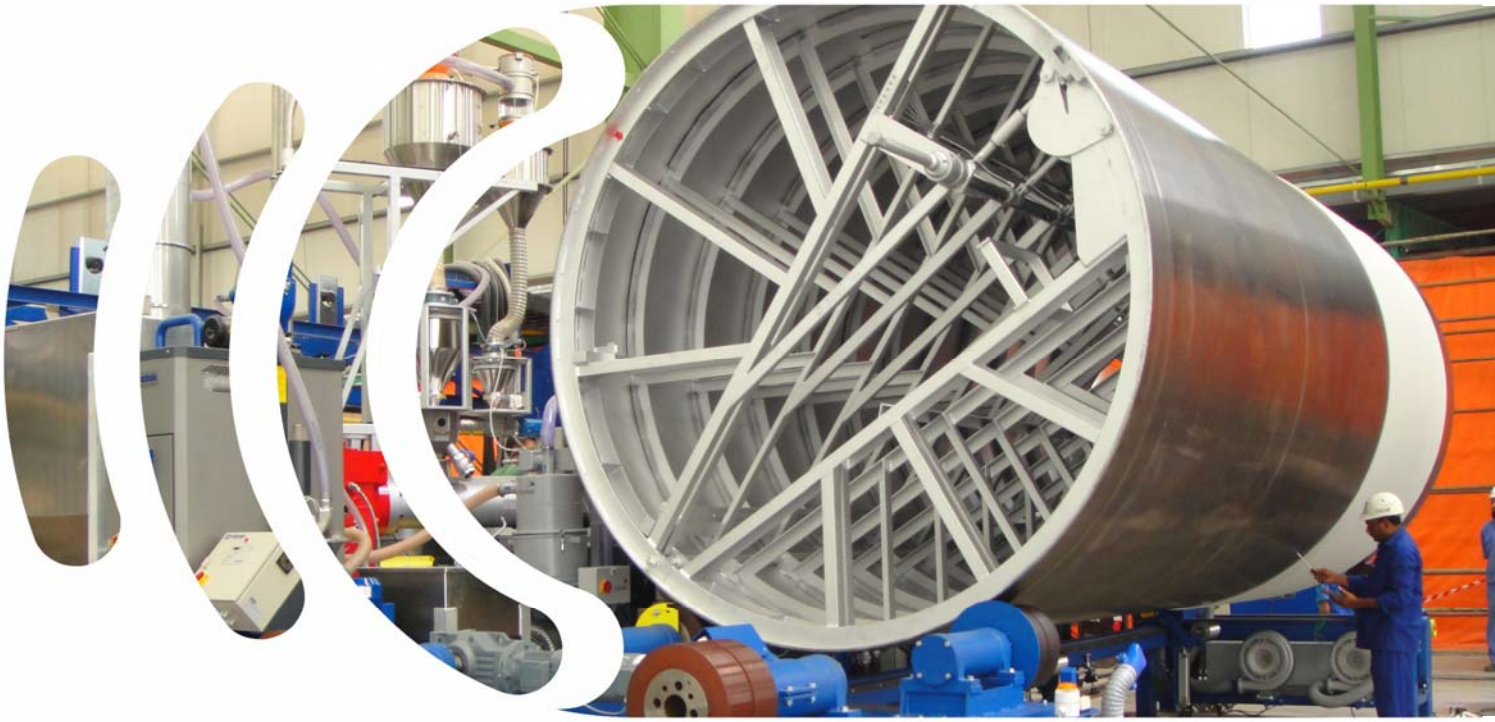
bauku



profilline

p-series

Extrusion lines for high ring stiffness profile pipes

since 1956 original


1
bauku
bauku
bauku
2

The product application

First we think of the perfect product.
Second we design the perfect machinery.

There is a good reason why we first show the product of our machinery and its application, before we show details of the extrusion line. We are not only a machinery company, we also have experience in pipe production, marketing and installation of plastic pipe systems in Germany since the year 1956.
Additionally we support our customers worldwide in regard to engineering and installation in sophisticated projects.

We are always looking for a product improvement first before we are changing the machinery design.

Our customers can rely on the fact that we never forget about the practical use of every innovation for the final product application.

Besides different diameters, profiles and stiffness values, various jointing methods such as rubber ring joint, extrusion weld joint or electro fusion weld joint are available to find the best solution for every task.

1 PE storm water retention tank in the City of Engelsbeke, Germany, DN 3500, discharge manhole with 90° bend

2 Same project, inlet structure DN 3500 with inspection entry, sewer pipes DN 1200 for incoming sewer

Obviously producing a pipe is the most easy part, however a complete pipe system with all kind of fittings, bends, manholes and special structures is our main competence and that is what makes the **bauku** technology unique. We are able to use PE100 or modern PP for the extrusion process, two materials which are second to none in quality.

Water technology

Our PP types or PE100 types have a certificate for the storage and transport of drinking water and certainly rain water can be handled easily as well.

Furthermore our products are resistant against salty water which makes them number one for sea outtake or sea intake pipelines.

3 PP high load pipe DN 3400 for a sea water intake and outtake pipeline near Wilhelmshaven, Germany. The pipes are linked with extrusion weld joint to a section length of 80 m.

4 PP high load bend DN 3400 for the project under number 3. Two parallel bends are prepared at a swimming platform and are lowered to the sea bed later.

5 PP high load tank DN 2000 for drinking water storage and distribution. The length is 18 m including an inspection shaft at one end of the tank.

6 Control and distribution chamber for drinking water in a DN 2500 PP high load pipe. The chamber is separated from the tank by a welded wall, so that the valves can be used in a dry condition any time.

Sewer technology

Due to the high chemical resistance of PP and PE our pipe systems can handle every kind of sewer easily. We also cover all embedding conditions and take all static loads.

In case of very slow water speed in the system it is important to know that dirt and sediments do not stick constantly to our material. We call this the “self-cleaning effect”.

7 PE manhole DN 1200 with pipeline DN 800. The standard manhole is ready to take concrete rings on top up to the road level. The pipes are linked with a push fit joint (rubber ring).

8 PE pipe DN 1200 in a narrow trench condition, ready to be embedded in liquid soil. The socket is equipped with a push fit joint.

9 PP high load storm water retention tank made from a storage pipe DN 2600 and a valve manhole DN 2000 as well as a tangential shaft DN 1200. The pre-fabricated tank is installed into an existing sewer line.

10 PE storm water retention tank with main pipe DN 2000, discharge manhole DN 2000 and overflow to the control manhole DN 2300. The tank is installed as a by-pass version next to an existing sewer line.

Industry technology

High concentrations of aggressive chemicals, high temperatures and sometimes inner pressure - this makes the industry technology a sophisticated application.

Often industry customers also require to follow their in-house standards in addition to national or international standards. Our production is flexible enough to meet the specifications.

11 PP high load pipe DN 2600, container terminal of the City of Duisburg, Germany, extrusion weld joint

12 PE80 sewer pipe DN 2000, double bend 45°, cooling water intake from the river at Degussa, Rheinfelden, Germany, extrusion weld joint

13 PP solid wall pipe DN 900, flame-retardant, for clean room air conditioning for computer chip production at AMD in Dresden, Germany

14 PE100 sewer pipe DN 1000 with manhole DN 1500, river outfall at Evonik at the City of Rheinfelden, Germany

Landfill technology

Here the quality of a pipe system is tested to its limits. There is no other environment which is so difficult. Only PE and PP are able to handle these conditions.

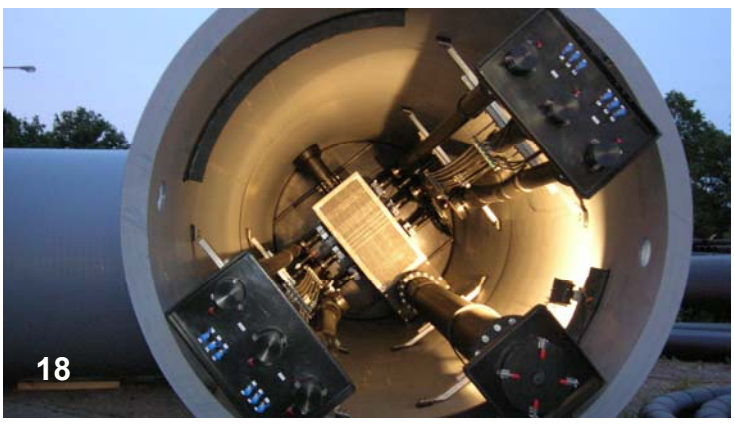
Settlement in the waste up to 30 %, aggressive liquids, aggressive gas, high temperatures and a load of up to 100 m waste on top of our pipes. We have proven to be successful under these conditions for decades.

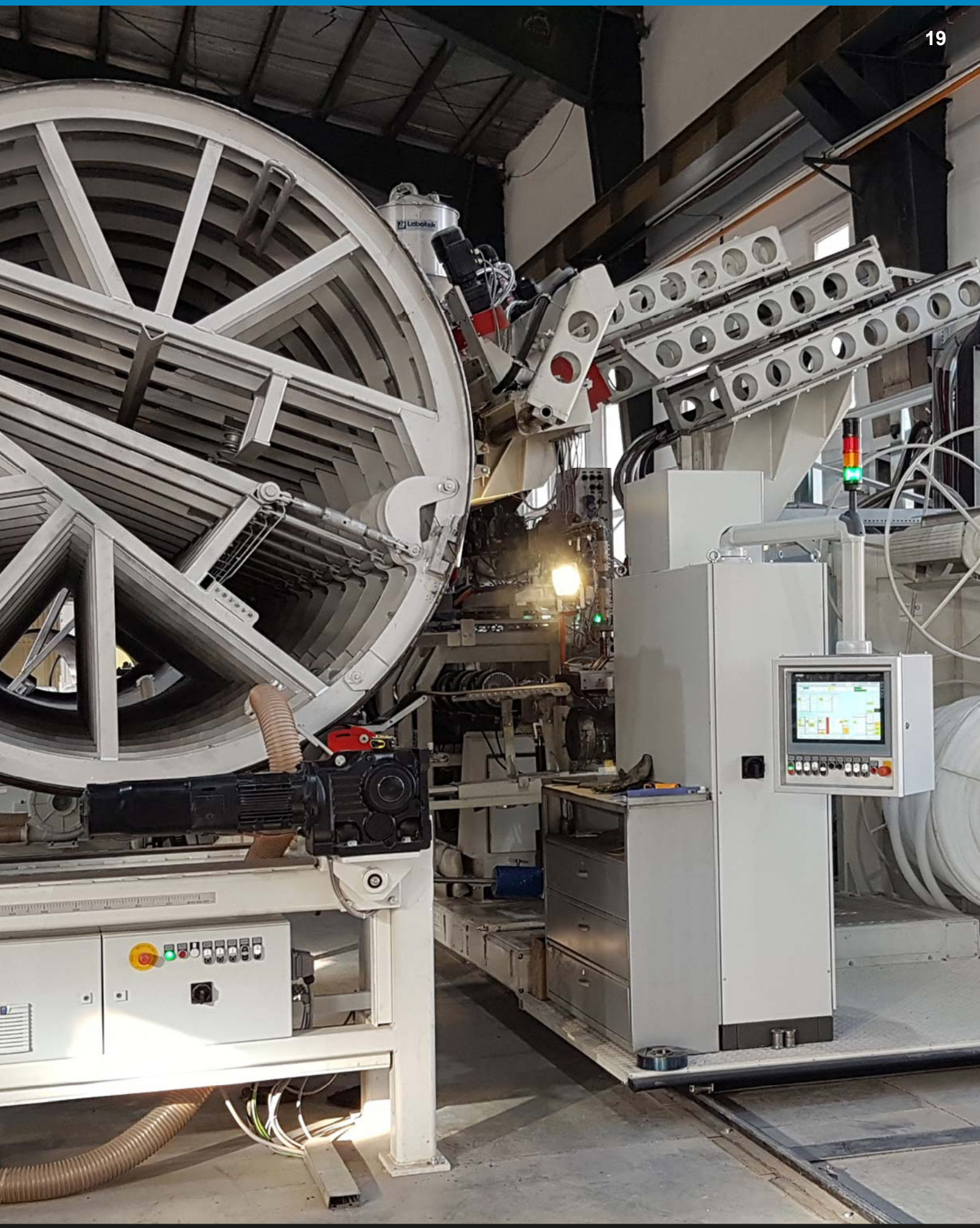
15 PE100 manhole towers DN 2000, height 25 m, for the collection of leakage water and gas in the landfill site Schoenberg, Germany

16 PE80 telescopic manhole tower DN 3000, height 100 m, for the collection of leakage water and gas in the landfill site Mechernich, Cologne, Germany

17 PE100 leakage water tanks DN 3500, battery of 4 tanks at the landfill site in Belgium.

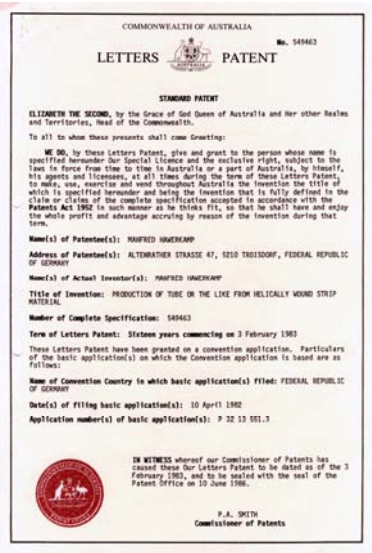
18 PE100 gas distribution manhole DN 2500 on the storage of bauku, ready for shipment to the customer.





The machinery

When **bauku** in Germany started the pipe production in year 1956, the winding process was invented. First the main customer was the industry needing tanks for the storage of aggressive chemicals. As a result, the first pipes were made without a hollow profile, just a solid wall construction was used. However some years later the need for high ring stiffness pipes was becoming more and more evident, so the famous omega profile was invented.



COMMONWEALTH OF AUSTRALIA

No. 549463

LETTERS PATENT

STANDARD PATENT

ELIZABETH THE SECOND, by the Grace of God Queen of Australia and Her other Realms and Territories, Head of the Commonwealth.

To all to whom these presents shall come Greeting:

WE DO, by these Letters Patent, give and grant to the person whose name is specified hereunder Our Special Licence and the exclusive right, subject to the laws in force from time to time in Australia or a part of Australia, by himself, his agents and licensees, at all times during the term of these Letters Patent, to make, use, exercise and vend throughout Australia the invention the title of which is specified hereunder and being the invention that is fully defined in the claim or claims of the complete specification accepted in accordance with the Patents Act 1952 in such manner as he thinks fit, so that he shall have and enjoy the whole profit and advantage accruing by reason of the invention during that term.

Name(s) of Patentee(s): MANFRED HAVERKAMP

Address of Patentee(s): ALTENRATHER STRASSE 47, 5210 TROISDORF, FEDERAL REPUBLIC OF GERMANY

Name(s) of Actual Inventor(s): MANFRED HAVERKAMP

Title of Invention: PRODUCTION OF TUBE OR THE LIKE FROM HELICALLY WOUND STRIP MATERIAL

Number of Complete Specification: 549463

Term of Letters Patent: Sixteen years commencing on 3 February 1983

These Letters Patent have been granted on a convention application. Particulars of the basic application(s) on which the Convention application is based are as follows:

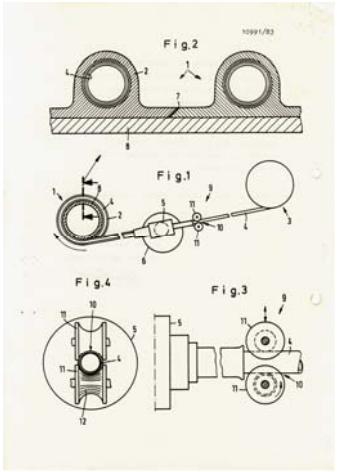
Name of Convention Country in which basic application(s) filed: FEDERAL REPUBLIC OF GERMANY

Date(s) of filing basic application(s): 10 April 1982

Application number(s) of basic application(s): P 32 13 551.3

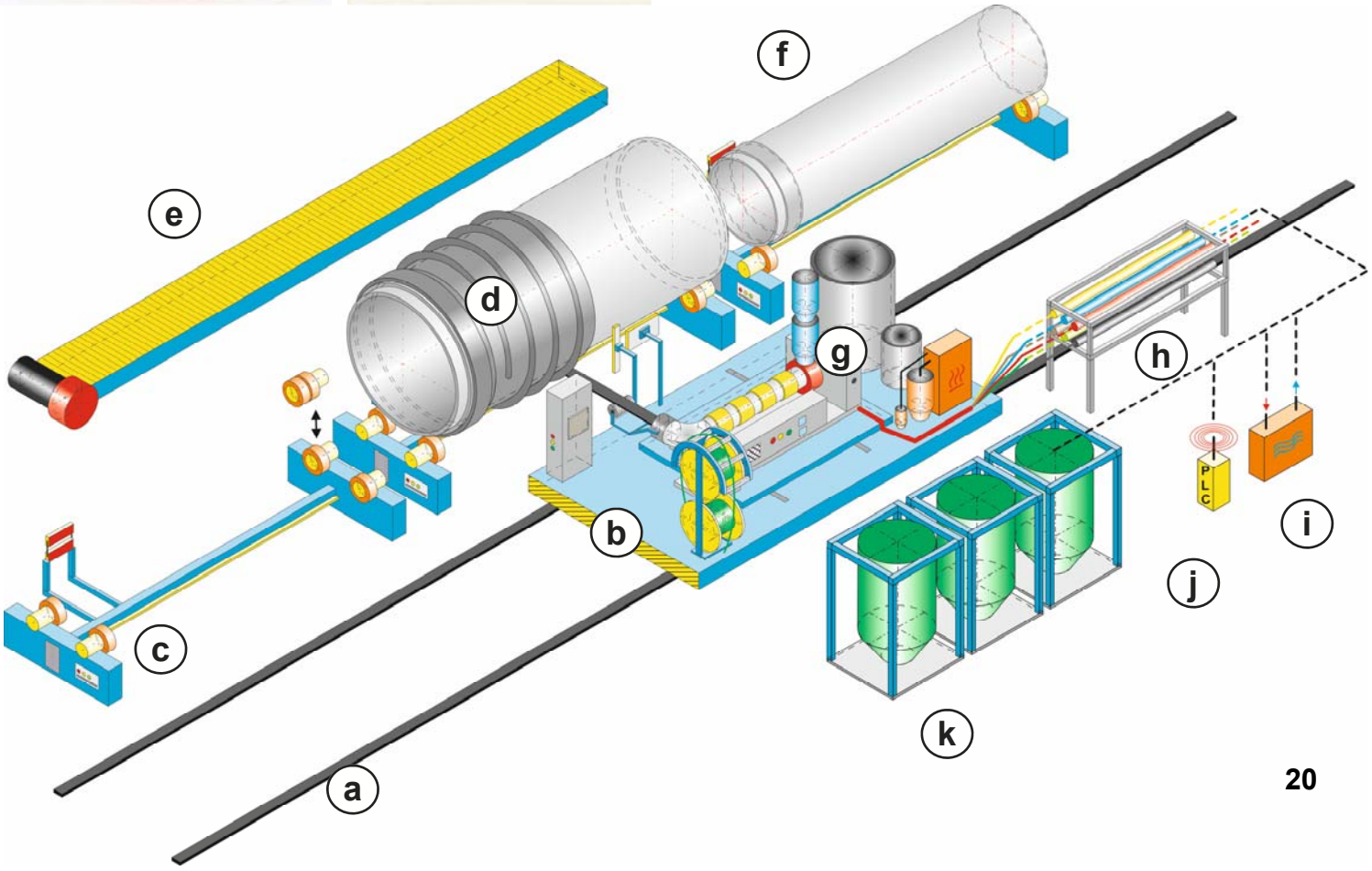
IN WITNESS whereof our Commissioner of Patents has caused these Our Letters Patent to be dated as of the 3 February 1983, and to be sealed with the seal of the Patent Office on 10 June 1986.

P.A. SMITH
Commissioner of Patents



Since half a decade this profile has proven its quality in the praxis and even though the design was optimized several times, the origin is still obvious.
The omega type profile is still the best solution for a high ring stiffness combined with a low material consumption. The round shaped profile avoids stress peaks in the pipe wall under load and this is a guarantee for a linear deformation behavior in praxis.
Of course the engineers at **bauku** created more innovations over the years and some key innovations have been protected by patents as well. These innovations and patents demonstrate that **bauku** is the market leader in respect to development and quality in both fields, for the plastic products as well as for the machinery lines.

19 : **profilline p-series**
20a: rail system
20b: carriage with extruder
20c: winding station
20d: extruded profile pipe
20e: dismantling station
20f : steel mandrel
20g: resin storage and gravimetric feeding
20h: energy supply chain
20i : water cooler
20j : PLC, online control unit
20k: big bag discharge station



19 **profilline** with 2 winding stations, mandrel DN 2500 on each station
20 Extrusion of a square profile for the first layer on the mandrel
21 Extrusion of a round profile for the second layer on a mandrel
22 Extrusion of a square profile including a co-extrusion in yellow colour for the first layer on a mandrel
23 Heating of the mandrel surface with a gas burner
24 The **bauku** twin head technology, one head for the square profile, one head for the round profile

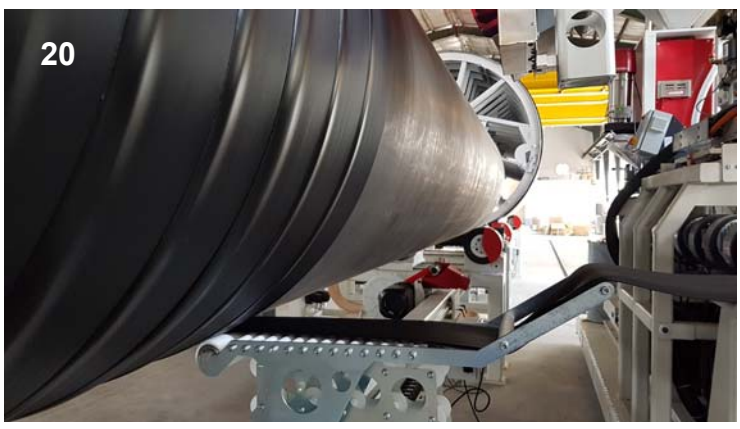
Each winding station is able to handle different mandrel diameters. The extruder on the carriage and the rail system is passing the stations. The extrusion line is flexible enough to produce pipes with different diameters and different profiles without loosing much time for a change of tools.

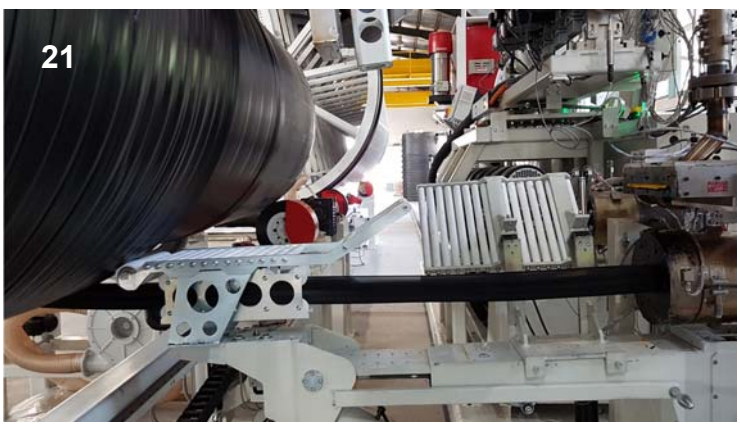
The combination of the square profile with or without co-extrusion colour and the round profile allows a variety of different profiles and ring stiffness values for each pipe.

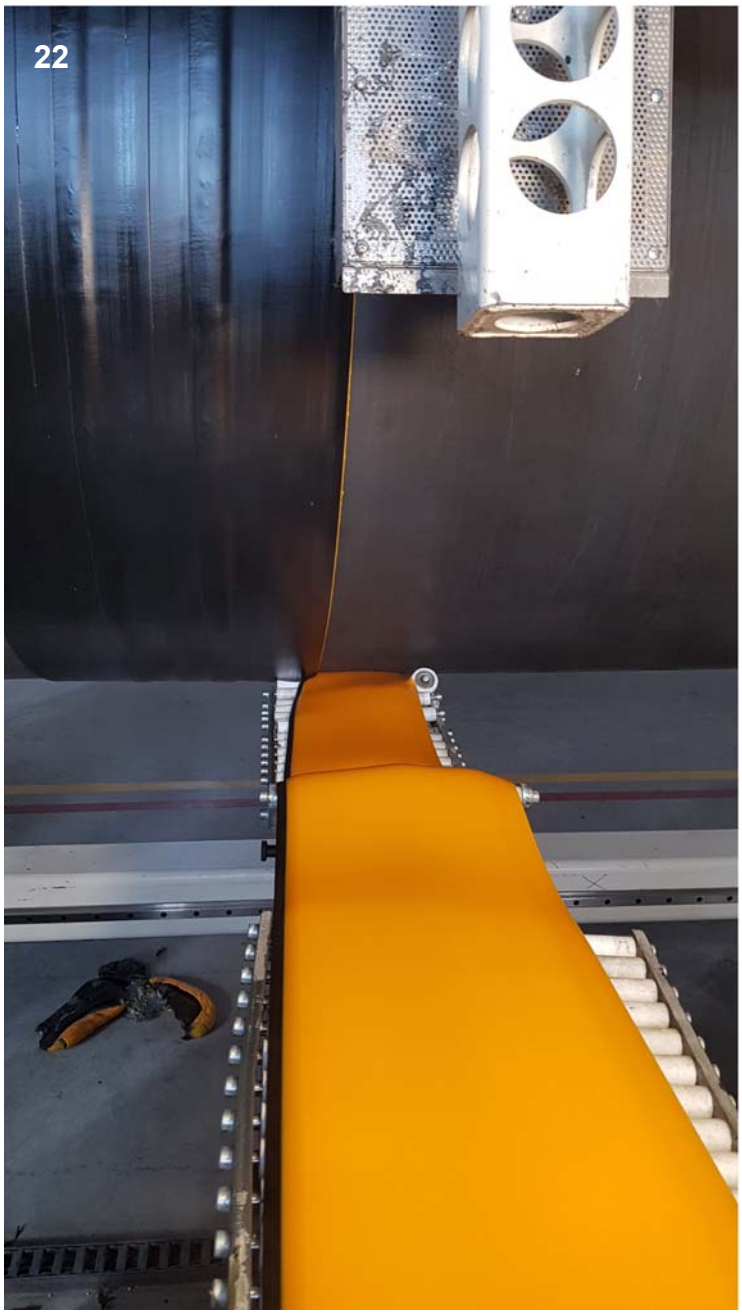
- square profile SQ: 5 mm to 10 mm in one pass
- Round profile R : 3 mm to 6 mm wall around core
- Round profile R : 31 mm to 97 mm core size

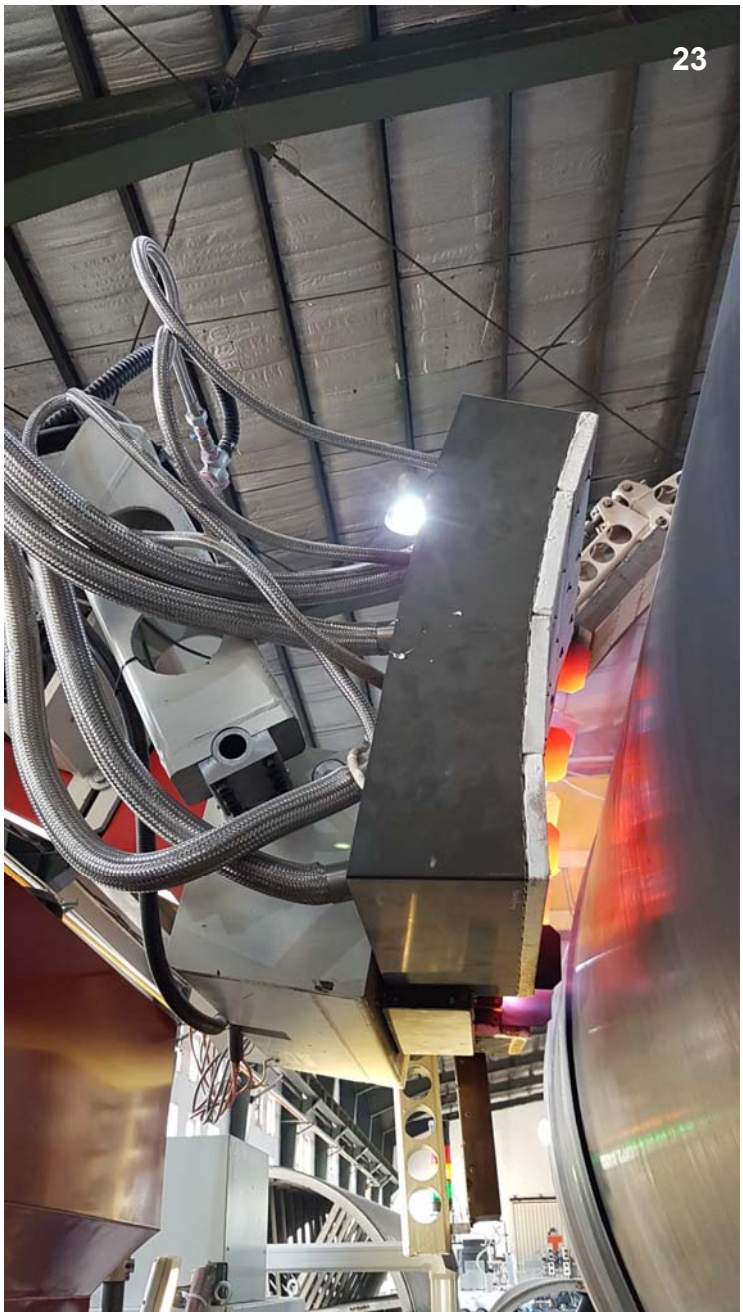
To switch between the square profile and the round profile in production it just needs to press a button. An electronic motor with a cylinder will move the valve in the twin head to feed material into one of the die heads. It is also possible to run both die heads at the same time and to create a pipe with smooth inside and profiled outside wall in just one pass.

As a result the customer is able to create nearly every profile and stiffness he likes and he is not limited to standardized values.



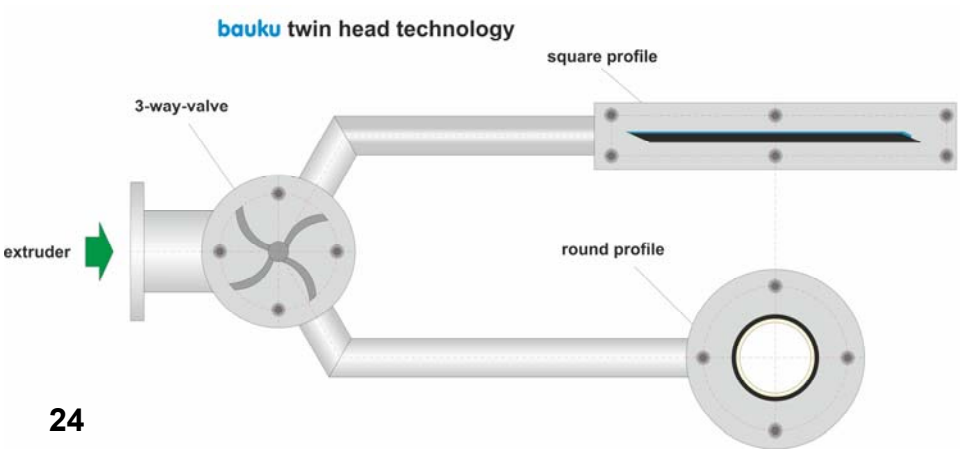


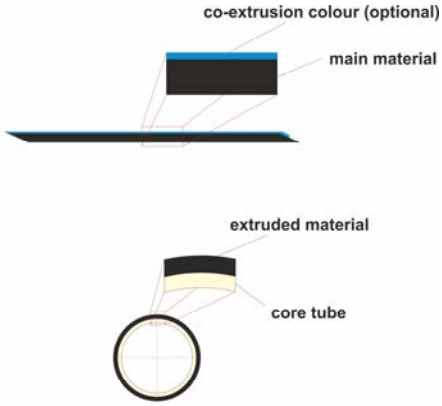




For the main material we recommend PE100 or modern PP grades with an MFR value not under 0,25 g/10min according to ISO 1133.

For the co-extrusion colour we recommend materials with an MFR value not under 0,5 g/10min. A list of reference materials is available on request.

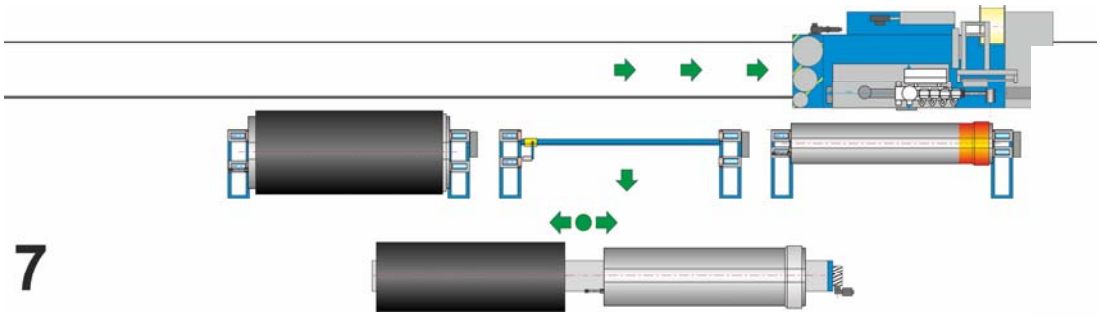




24

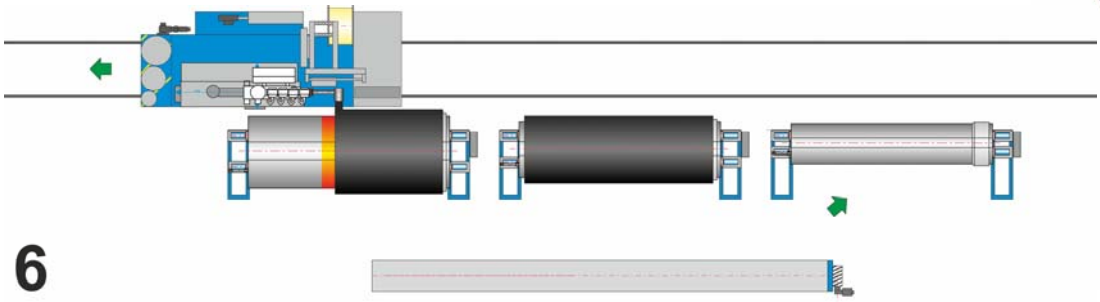
The production cycle

Example:
profilline p-series with three winding stations and three mandrels. The sizes of the mandrels are different, as the extrusion line is able to handle these diameters without a change of tools. In case a customer wants to produce one diameter in larger quantities, we recommend to invest into two or three mandrels of the same diameter.

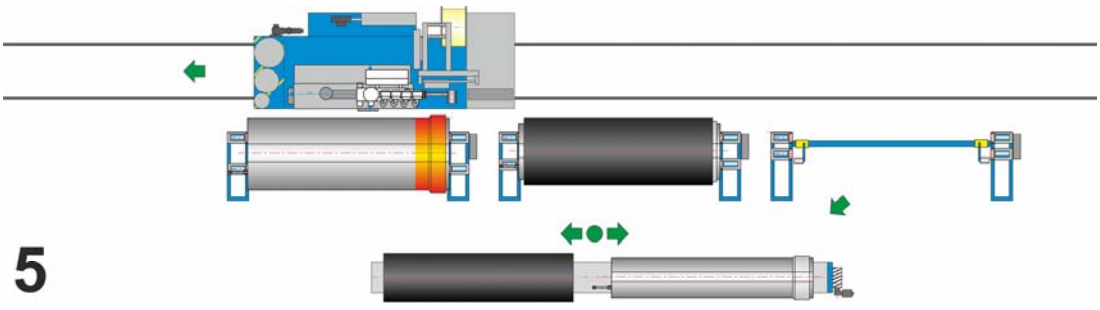


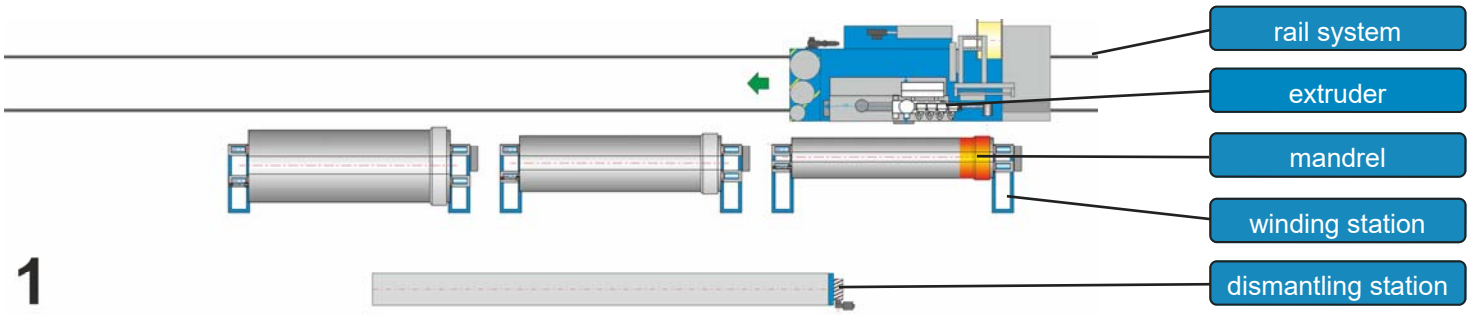
The third pipe is extruded and the extruder is moving back to the first winding station, the third pipe is cooling down, the second pipe is dismantled. Now the production cycle can start again from the very beginning.

The third pipe is in production, the second is cooling down and the first mandrel is back on the winding station.



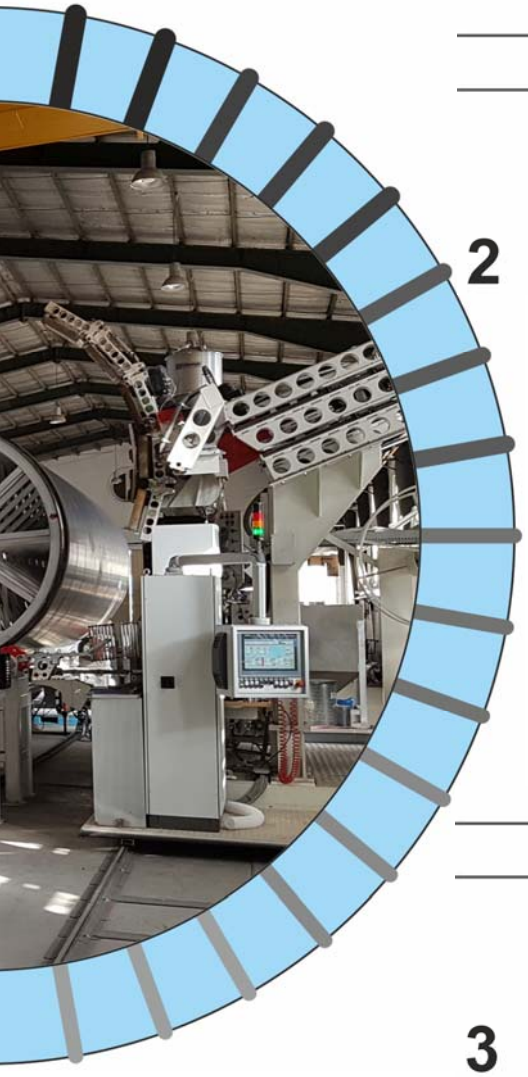
The extruder finished pipe number two and the third mandrel is heated up, while the first pipe is dismantled from the mandrel.

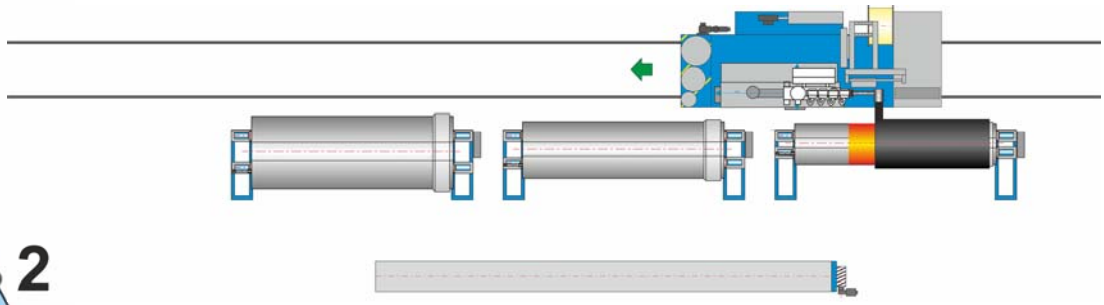




1

The first mandrel is heated up to a surface temperature of approximately 200° C.

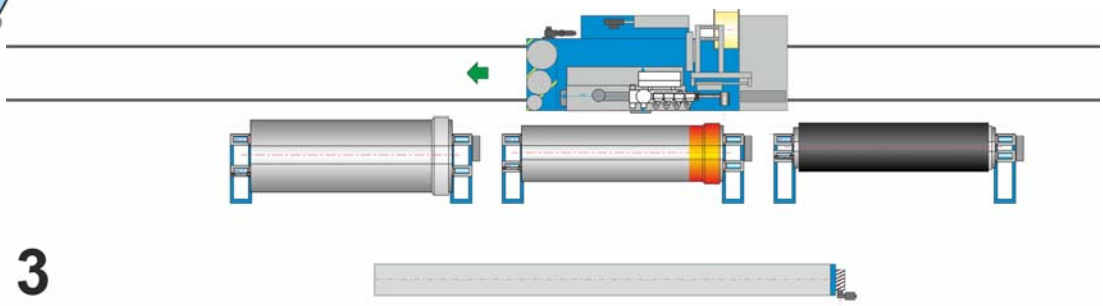




2

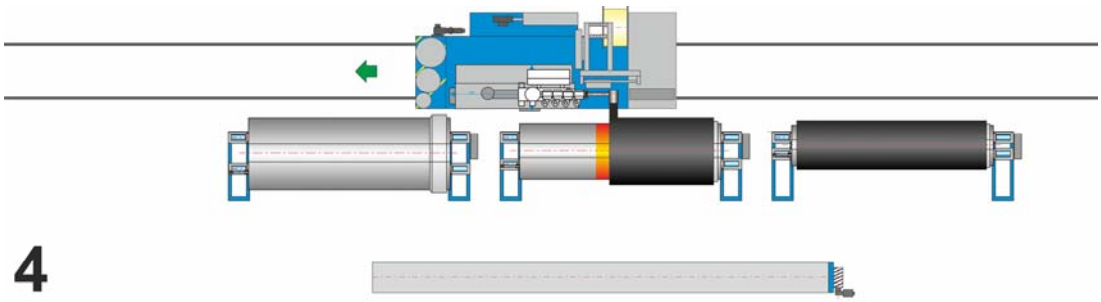
The winding of the first profile pipe is started.

The first pipe is produced and is cooling down, while the extruder is moving to the second mandrel, which is heated up now.



3

The second pipe is under production, while the first one is still cooling down.



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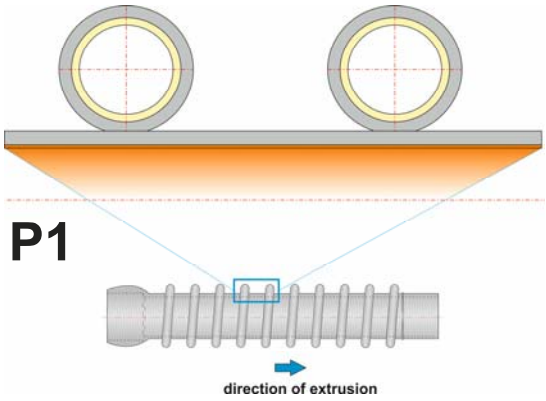
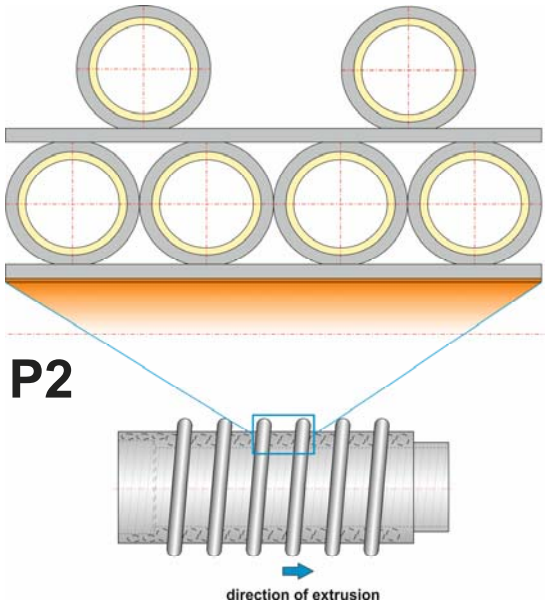
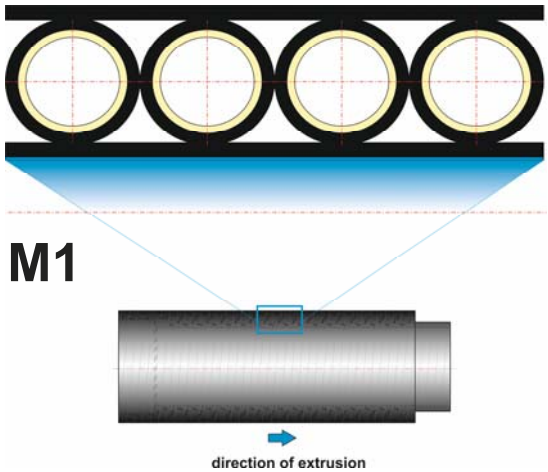
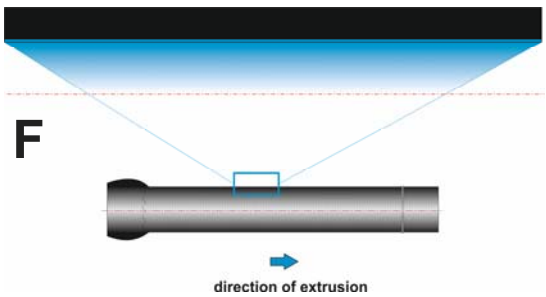








The different profiles

P1-profile

This is the most efficient profile, if a high ring stiffness but a low weight is the important aim. The ground layer (inside wall) of the profile is at least 5 mm, which is not a question of the stiffness, but of the handling at the job site. The round shape profile on top is using an inside core tube of OD 31, 53 or 84 mm and in addition the wall thickness around the tube and the profile distance can be adjusted to the needs of the project. This makes this profile number one in flexibility and efficiency. The sketch on the left side shows a profile made from grey color PP with a MFR > 0,3 g/10min and a co-extrusion layer from brown color PP with MFR > 0,5 g/10min.

P2-profile

In case the P1-profile will not supply enough stiffness for larger diameter pipes, the P2-profile is chosen. It is a four layer pipe with an internal M1-profile (see below) and a round shaped hollow profile on top. The distance between the very last profile ribs allows to adjust the pipe stiffness to the needs of the project.

M1-profile

This is the right profile for pipes which are installed in vertical position, like shafts and tanks. The ground layer and the top layer are solid wall of at least 5 mm, in between there is a round shape profile, using a core tube of OD 31, 53, 84 or 97 mm. This profile is not as efficient as the P1-profile or the P2 profile, however it is able to take much more stress in axial direction. Furthermore the smooth outside and inside makes it easier to fabricate fittings and manholes from this profile. The sketch on the left side shows a profile made from black color PE100 with a MFR > 0,25 g/10min and a co-extrusion layer from blue color MDPE with MFR > 0,5 g/10min.

F-profile

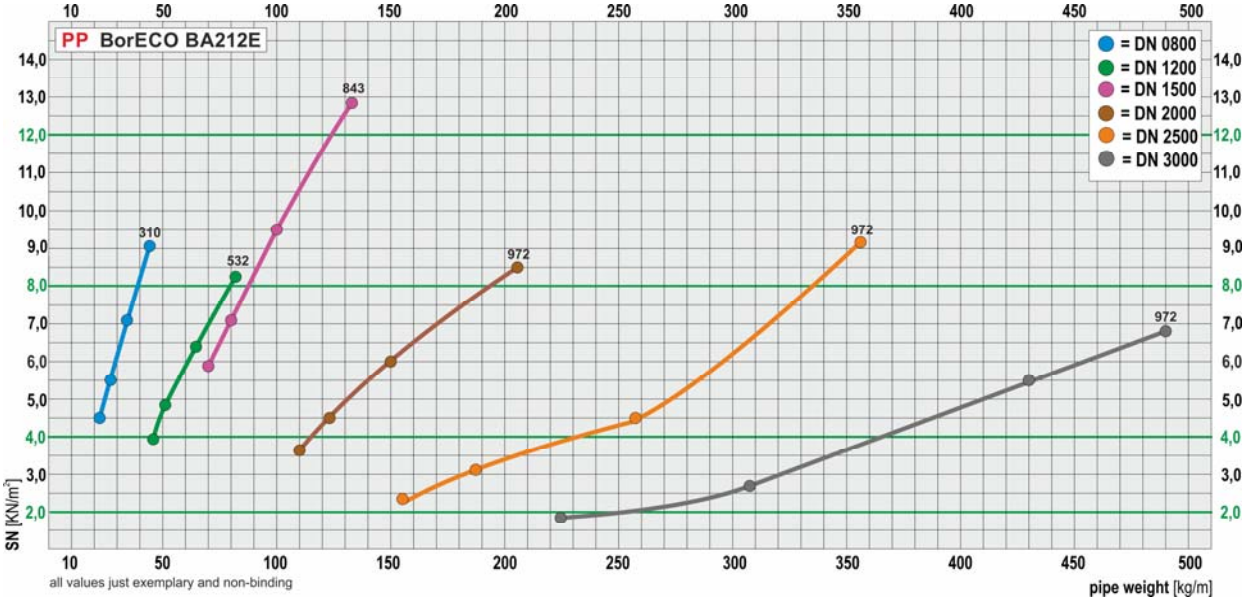
This is the right profile, if small diameter fittings have to be fabricated (e.g. bends) or small diameter shafts. The P1-profile might be to complicated to cut and to weld, the M1-profile might be too stiff and might use too much material. In case of inside pressure (e.g. vertical tanks for liquids), the norms and standards require a solid wall without profile anyway.

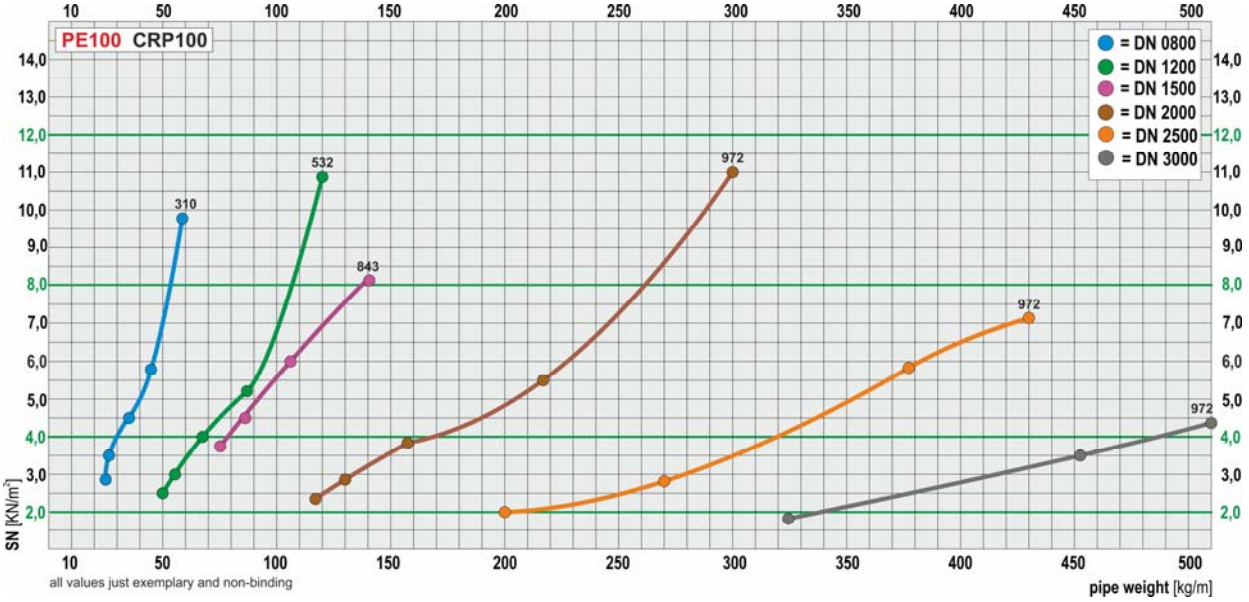
diameter range: DN 300 mm up to DN 5000 mm

0300	0900	1500	2100	2700	3300	3900
0400	1000	1600	2200	2800	3400	4000
0500	1100	1700	2300	2900	3500	4500
0600	1200	1800	2400	3000	3600	5000
0700	1300	1900	2500	3100	3700	
0800	1400	2000	2600	3200	3800	

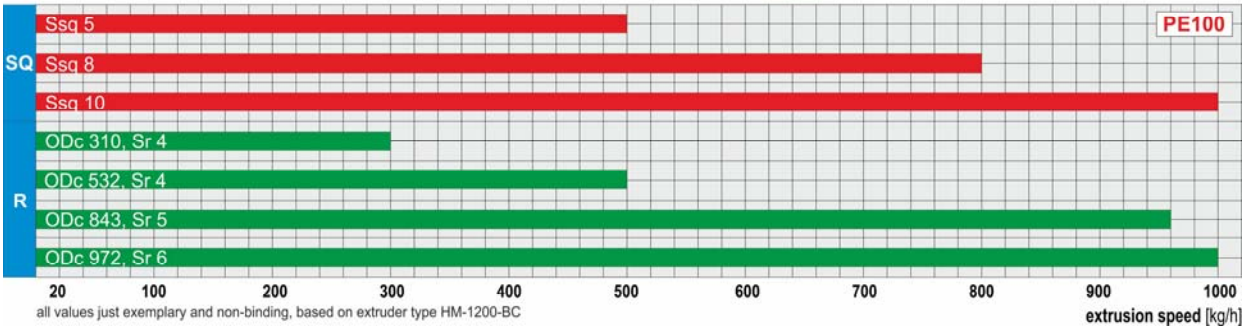
Standard sizes in blue color. Other dimensions (e.g. inches) on special request.

Stiffness against weight

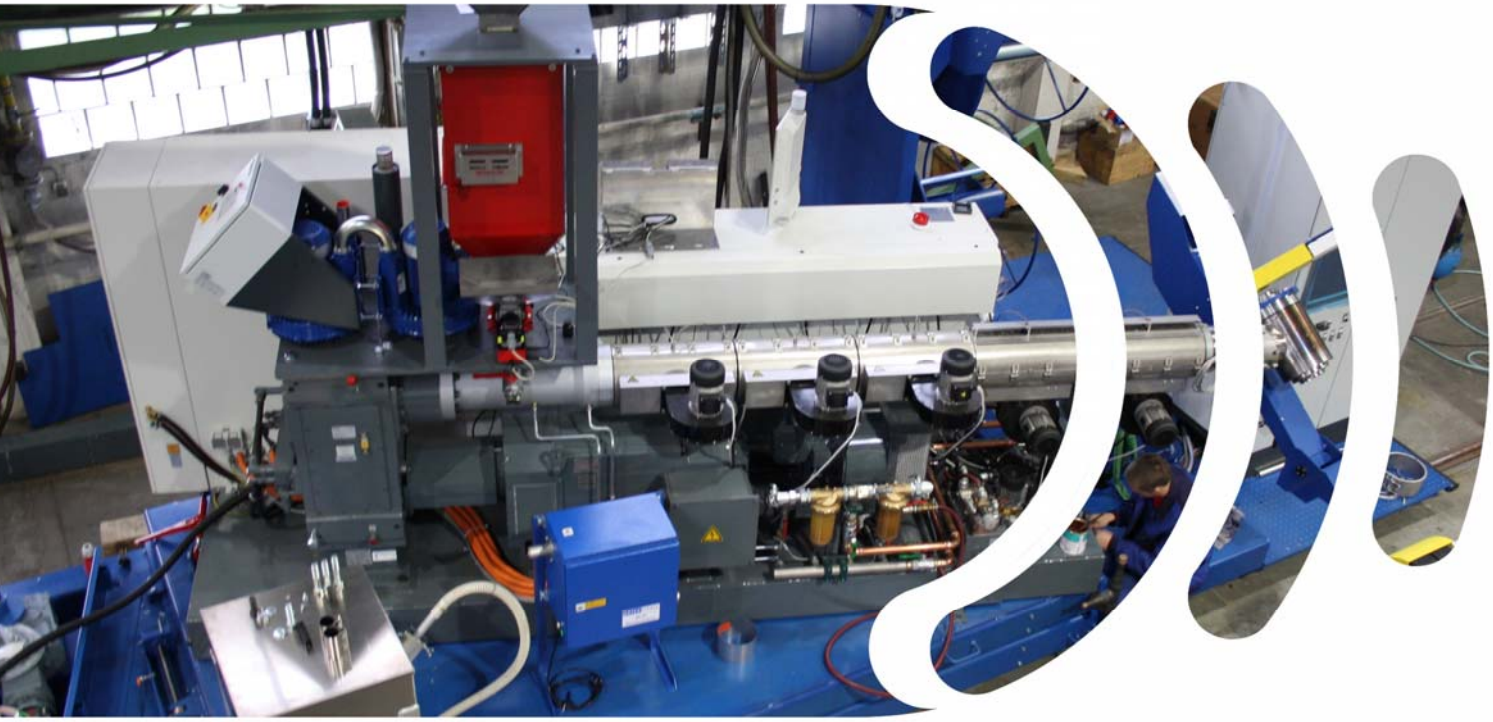




Extrusion speed



The possible extrusion speed does not so much depend on the diameter which is produced but more on the profile tool which is in use. The bigger the profile, the faster the extrusion speed.



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