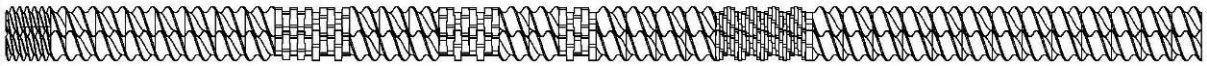
COMBI 26 mm Twin-Screw Extruder type LTECC26-40

With Co- and Counter-rotating twin-screw for compounding of PVC and most other thermoplastic resins

26 mm COMBI twin screw with 15 KW drive and L/D of 40



Co-rotating screw for most thermoplastic resins

New Counter rotating PVC screw

The Scientific 26 mm Combi co and counter-rotating twin-screw extruder is made with a complete modular build-up of the clamshell barrel, where each barrel section has a length of 4 D or 104 mm. The standard twin has a drive power of 15 KW and a max screw RPM of 400 for counter and 800 for Co-Rotating. It has a re-designed high torque gearbox comprising of additional shaft supporting gears, and a direct drive gear pump for closed-loop forced oil lubrication and cooling.

A pull-push mechanical gear selector will switch the screw rotation from co to counter-rotation. It is located at the rear of the gearbox as shown here with the arrow.

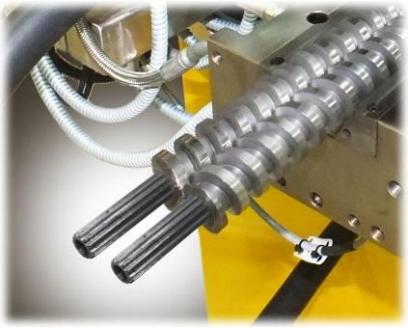
The 26 mm twin screw version is equipped as standard with splined screw shafts. The new oil cooling system for our high torque gearbox utilizes a block type of heat exchanger to ensure the gearbox is kept cold at even the severest running conditions. This also ensures optimum lubrication to all gears and bearings.

The modular Clam Shell Barrel is equipped with exchangeable barrel lining inserts for optimum economy and ease of replacement. These standard inserts are made from a very high-grade tool steel which is through hardened to over 60 RC and which can withstand high processing temperatures of up to 400 °C. This unique barrel insert system was designed by us in 2003 and has proven during the years to be a very good feature. Further, our twins can be supplied with inserts made from stainless steel for corrosion-resistant.

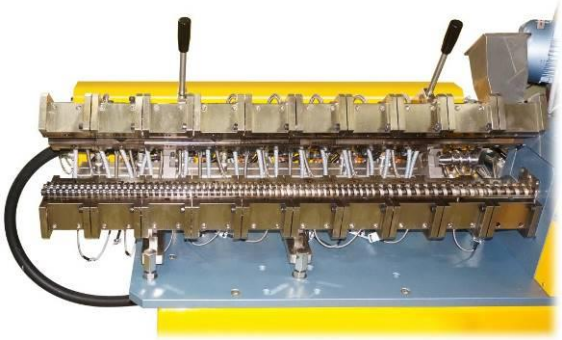
The inserts are touching each other side by side along the barrel, but the actual body parts (barrel modules) are connected to each other with a small air gap. This gives excellent insulation between the zones, preventing that heat is conducted from one zone to another. With this, it is possible to run with a higher temperature difference between each zone, which in turn allows for much greater flexibility when running various polymers with different melting points.

The inserts also have narrow ridges on both sides which are precision ground and which acts as the sealing area when the clamshell barrel is fully closed. This ensures that there is a complete seal along the entire barrel length which, together with the extremely hard and scratch-free surface, ensures that there will be no leaks during the entire lifetime of the inserts.

The screws are built up from single individual elements mounted on splined screw shafts. We have a large variety of screw as well as kneading elements which are available in several configurations. The standard screw components are made from high-grade tool steel which is through-hardened and nitrided but made with a slightly softer hardness than the barrel linings to ensure optimum lifetime for both elements and barrel inserts. Optionally the screw elements and barrel inserts can be made in hardened stainless steel for acid resistance or in very hard PPM steel for optimum wear resistance which may be needed when compounding ceramic materials

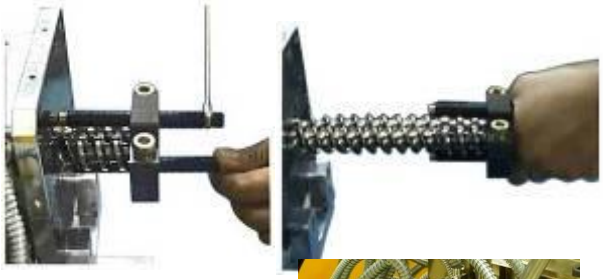


The whole clamshell barrel assembly is split in the center and can be easily swung open after loosening the barrel bolts.



This gives easy access to the screws for cleaning or changing of barrel inserts as well as to observe the melt and compounding characteristics of the polymer being processed. The top half of the barrel is balanced, so that very little force is needed to open it up and with this, the hazard of accidental heavy closing is eliminated.

Each barrel zone is equipped with both water cooling and electric cartridge heating. This allows for complete process control at each zone of the barrel and the water cooling coupled with the high wattage heating enables fast temperature changes of each zone when changing processing conditions from one compound to another. The water cooling is done from fine channels inside each barrel module and regulated with individual solenoid valves from its designated temperature controller.



It is not necessary to open the clamshell to clean the screws. Instead, for fast and easy cleaning, the screws can be pulled out from the front with the help of a quick clamp tool supplied with the machine.

The extruders are also, as standard, equipped with a four holes strand die connected to extruder flange with two hinged bolts. The die is made with short distance to screws and minimum internal volume to enable very easy and fast cleaning. The die flange contains an easily removable breaker plate which can be exchanged with a distance ring, enabling production with or without screen packs.

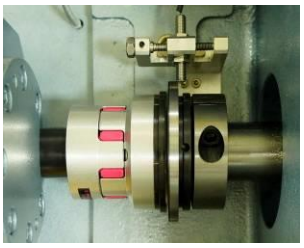
The strand die swings aside simply by loosening the two bolts to facilitate easy cleaning. For connection to other downstream equipment, such as flat die for a chill roll attachment, the extruder can optionally be supplied with a suitable die adaptor.

The extruders are supplied complete with a stainless steel volumetric hopper feeder with a single feed screw of spiral or solid screw types and with a stirring arm (agitator) above the feeding screw. The hopper feeder can optionally also be equipped with twin screws. The screw is driven by variable speed AC gear motor of 0.3 kW power and digital screw speed control mounted on the control cabinet. As shown to the right, the hopper feeder can easily be swung aside to enable emptying out of the batch in the hopper.

The extruders can optionally be equipped with one or more twin screw side feeders which are connected to the side of the barrel module. A special barrel module with opening as well as plug for side feeder is needed for this option, and the extruder can be supplied with several plugged side feeder modules for optimum flexibility of side feeder location. The side feeder has an infinitely variable speed drive with 26 mm diameter twin screws built up from the same elements as the main screws, and with an L/D ratio of 7. The barrel of the side feeder is equipped with water cooling as standard.

This 40 L/D extruder is equipped with a vacuum zone on one of the barrel modules and also have an additional atmospheric vent opening which can be converted to vacuum. The vacuum vent zone has a stainless steel vent port housing which is equipped with a sight glass and vacuum regulator with gauge. The housing is connected to large twin vacuum filters and a vane type vacuum pump mounted in the sub cabinet.

The coupling in between the gearbox and the drive motor is equipped with a torque limiter which will instantly disengage the coupling in the event that the screws are overloaded. The torque limiter is also equipped with a sensor which will stop the motor and a warning lamp on the control panel will indicate that the screws have been overloaded.



The extruder is equipped as standard with a large, clear vision control panel with digital instruments and symbols for all functions. The optional computerized control has a large 10.4-inch touch screen, also showing all machine functions on the main screen.

Summary of standard features:

- 26 mm Combi co and counter-rotating extruder barrel section is fully covered for safety propose and to protect from dust.
- 26 mm Combi co and counter-rotating segmented screws where each segment can be placed anywhere on the spline screw shaft for optimum flexibility of screw configurations. The kneading elements are supplied as single sectors which can be placed against each other in various angles enabling numerous kneading and shearing functions.
- All screw elements and barrel inserts are also available with high corrosion resistant steel type SUS440C and with very high wear-resistant PPM types of steels
- Modular clamshell barrel with 40 L/D length and where each module has a length of 4 D. Barrel with balanced hinged top part for easy access to the screws.

- The modular Clam Shell Barrel is equipped as standard with exchangeable barrel lining inserts made from special high-grade tool steel which has been through-hardened to over 60 Rockwell C. This special steel also allows for high-temperature extrusions of up to 400 °C.
- The standard screw and kneading elements are also made from high-grade tool steel with through hardening and with a surface hardness of slightly below the hardness of the barrel inserts. Also, the spline screw shafts are made of treated tool steel for optimum stiffness and high torque applications.
- Water cooling as well as electric heating of each barrel module.
- High torque drives with a new oversized gearbox having forced and cooled oil lubrication.
- Stainless steel vent housing on the barrel equipped with sight glass and vacuum gauge as well as vacuum pump protected with large dual filters coupled in series and mounted in sub-cabinet of the extruder.
- Variable speed single screw hopper feeder with stirring arm over the screws. Feeder components are equipped with quick locks for easy cleaning, and the whole feeder assembly can easily be slid backward for access to the extruder in-feed opening.
- Practical 4-holes strand die connected to extruder flange with two hinged bolts. The die is made with short distance to screws and minimum internal volume to enable very easy and fast cleaning, also equipped with easily removable breaker plate in extruder flange, enabling production with or without a screen pack.
- Optionally the die flange can be equipped with an oval opening as well as oval-shaped breaker plate which allows for easier removal of the screws from the front, without removing the die flange.
- 300 bar pressure transducer at screw end, also equipped with the melt temperature sensor. Additionally melt sensors are placed on every second module, connected to digital temperature indicators on the control panel.
- Screws protected by a new sensitive torque limiter mounted in between the motor and the gearbox.
- Modern design with a sturdy sub-cabinet containing all electric and electronic components in compartments completely separated from the vacuum pump assembly.

- Large clear vision control panel, mounted on a swing arm on the rear of the extruder and containing the following:
  - One digital self-tuning programmable temperature controller for each barrel module (10 units for the 40 L/D versions).
  - Programmable pressure controller with digital indication of the screw tip pressure.
  - Digital melt temperature indicators showing resin temperature at the screw tip as well as at every second module. For the 32 L/D version there are then totally four melt temperature indicators, and the 40 L/D versions have 5 of the same indicators.
  - Digital RPM indicators for main screws speed as well as feeder screws speed with UP/DOWN scroll buttons to regulate speeds.
  - Digital instrument showing screw torque in percent of max torque
  - Clear warning lamps for:
    - Overpressure at screw tip (depending on your individually set max pressure)
    - Cooling water pressure too low

- Clamshell open
- Motor overload
- Torque limiter overload
- Feeder overload
- Temperature not reached set value on any of the controllers due for instance broken heating element

Maximum Production Output with our co and counter-rotation 26 mm twin-screw extruders

POLYMER TYPE (Regular pellets)	Melt flow Index (g/10 min)	Maximum Output Co-Rotating version		% of Maximum Motor Power	Screw (rpm)	Barrel temperature range ° C (starting from in feed zone)
		lb/hr	kg/hr			
LDPE	20	140	64	72	800	150 - 180
HDPE	15	143	65	84	700	180 - 200
NYLON*	-	156	71	92	700	260 - 280
PET *	-	110	50	82	600	280 - 300
ABS*	18	154	70	91	700	220 – 240
GPPS	8	171	78	82	800	220 - 240
HIPS	8	224	102	85	700	210 - 230
POM	9	189	86	87	700	220 - 240
PC*	19	145	66	87	700	270 - 290
PP	11	178	81	93	800	220 - 240
Counter-Rotating screws for PVC						
Soft PVC Powder		44-66	20-30	76	400	160-180
Soft PVC Pellet		88-110	40-50	85	400	160-180

Technical data for 26 mm Combi Co and Counter Rotating Twin-screw extruder					
Description	**DATA**		**Description**	**DATA**	
	Standard Co-Rotating	**PVC Version Counter**		**Standard Co-Rotating**	**PVC Version Counter**
Available L/D Ratio	40 L/D	40 L/D	Outer and inner screw diameter ratio (D/d)	1.63	1.63
Screw Speed (RPM)	0 to 800	0 to 400	Max barrel temp. (standard)	400 °C	400 °C
Motor Power (kW)	15 kW	15 kW	Heating power per barrel section (4 L/D)	2.0 kW	2.0 kW
Max. extrusion output pressure	300 bar	300 bar	Minimum water pressure and water consumption	3 bar/20lt/min	3 bar/20lt/min
Max. dynamic thrust bearing load	62 kN	62 kN	Water pump power for optional closed-looped cooling system	0.75 kW	0.75 kW
Maximum torque at 600 RPM	2x90Nm	2x90Nm	Minimum batch size (LDPE)	1,000 - 1,500 g	1,000 - 1,500 g
Specific Torque Nm/cm^3	9.8	9.8	Net weight (for 40 L/D)	1,000 kg	1190 kg