STEER

# THE POWER OF FLEXIBILITY

TO SCALE NEWER HEIGHTS IN PRODUCTION.

## SUPER SPL 40 EXTRUDER

A Product of STEER TECHNOLOGY

**SPL 40 – Super Production Lines**

*Compounding Pelletizing System.*

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STEER is a leader in Extruder Processing Zone (EPZ Products – Elements, Shafts, Barrels and Liners) with a global market share of over 15% and the makers of 'Generation Next Performance Extruders' that meet the needs of difficult applications. Now STEER is introducing its new line of 'Compounding Pelletizing System' that is dedicated to lean manufacturing.

What makes the SPL 40 unique are its features, high efficiency and attractive investment cost. The Extruder is compact and meets specific market needs with unparalleled engineering technology and craftsmanship, coupled with the reputed and reliable service of STEER.

SPL 40 is a compounding pelletizing system comprising of a Co-rotating twin-screw extruder with a Feeder, Strand die head, Water trough, Air knife, Pelletizer and Classifier. Built with greater emphasis on 'reliability and safety' to cater to the dynamic needs of the industry which arise of unscheduled /unplanned requirements for small quantities, control over work-in-progress (WIP) - during grade change and power failures, the lean operation feature of the system also allows effective testing of new formulations with minimum wastages.

Co-created through the participation of likeminded customers and STEER's Technology Team to answer some of the unresolved and challenging aspects of lean manufacturing and special manufacturing needs; through process and investments that are cost effective, efficient and easy to implement and perfectly engineered for production purposes.

With proven technology and relentless efforts by STEER to innovate, the SPL40 is precision manufactured using CAD/CAM technology. The line is designed for Six Sigma Process to ensure zero defects in product quality.

Exemplifying engineering excellence in EPZ products with STEER's expertise in metallurgy that focuses on minimizing wear & tear and corrosion in processing, ensure higher conformity to quality and efficiency in production sustenance.

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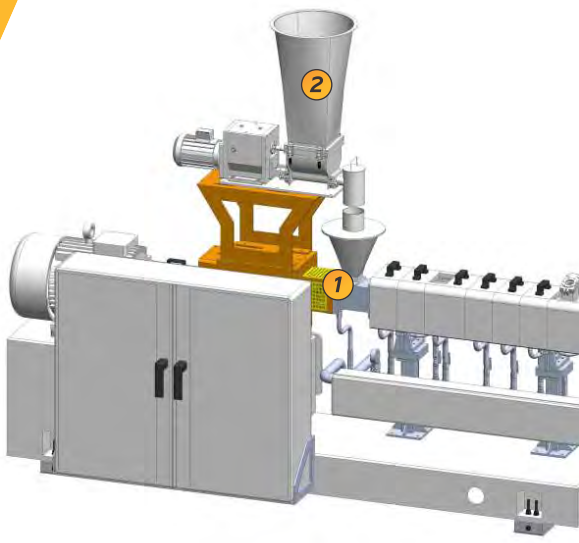
# HIGHLIGHTS

- Complete production line – from volumetric feeder up to pelletizer and classifier.
- Robust construction for 'interrupted small batch' production with no compromise on safety & reliability.
- Designed to swiftly respond to customer orders with minimum lead time for a variety of grades in small quantities.
- The only line capable of developing and testing new formulations, and scale up for commercial supplies.
- Comes with standard design, simplified operating steps, and universal screw configuration suitable for most grades based on Polyolefins and Styrenics
- Ensures minimum,' set-up-time', 'change-over-time' and maximum 'first-pass-yield'




# TECHNICAL FEATURES

## MAIN MOTOR

High efficiency air cooled AC motors suitable for variable speed application with protection rating of Ip55.

## VARIABLE FREQUENCY DRIVE

Modern microprocessor based vector controlled variable speed drive with torque control.

## TORQUE LIMITER COUPLING

Co-rotating twin-screw extruders require a decoupling device located between the extruder motor output shaft and the input shaft of the gearbox to protect the gearbox and screws from damage. The device is calibrated to disengage in the event of an over-torque condition. STEER provides a high quality coupling manufactured in the UK.

## GEARBOX

STEER HITORQ gearboxes are specifically designed for the high drive requirements of the twin screw extruder. The STEER HITORQ gearbox features the latest technological innovations in the industry. The housing material of construction is spheroidal graphite cast iron. Gears, larger pinions and shafts are case-hardened and ground to accuracy class DIN 5. Service Factor of the gearbox is greater than 1.5.

## CONTROL SYSTEM

A sophisticated PLC based control system is provided for safe running of the extruder. Safety and sequential interlocks are provided to take care of the heating and operating controls. All these and the corresponding SSRs, Power Supplies auxiliary motor starting and protecting equipment are all housed in a sheet steel panel.

## EXTRUDER PROCESSING ZONE

**SCREW ELEMENTS:** The screw elements are designed as modular units and available in various pitches and types, providing a high degree of process flexibility in regards to screw configuration. The elements are made of specialized tool steel material with appropriate heat treatment and precisely machined geometry. STEER screw elements are manufactured to very rigid standards, with the highest possible quality control. STEER screw elements are designed to maintain constant clearance during rotation and with globally accepted performance standards - specific torque of 8 $Nm/cm^3$ and diameter ratio of 1.55.

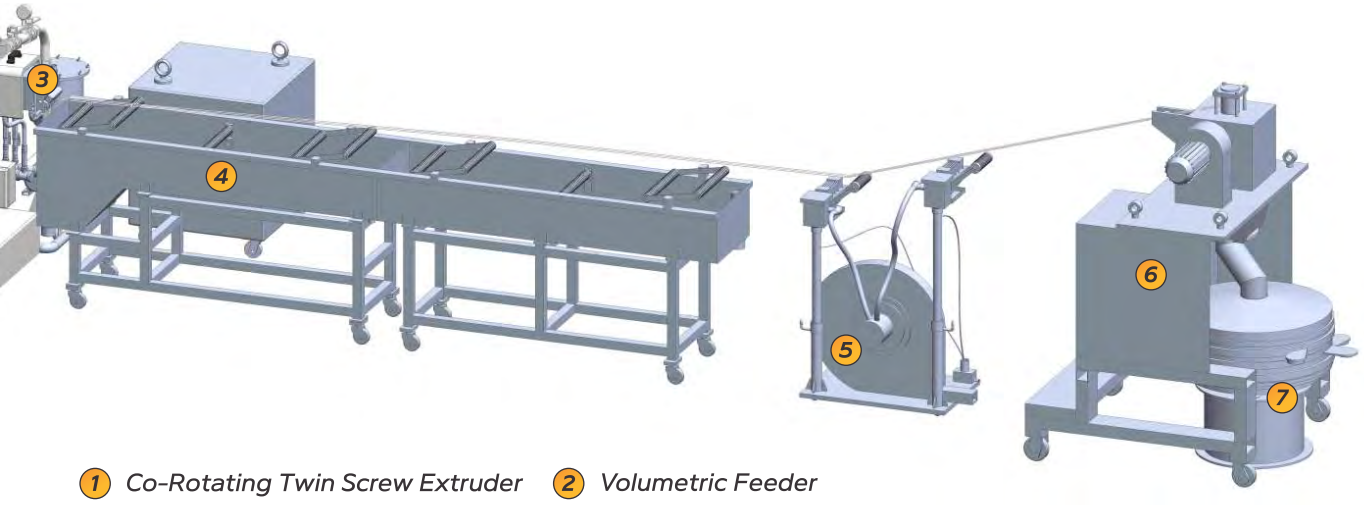
**SCREW SHAFTS:** The screw elements is mounted on a pair of spline shafts. The shafts are easily connected to the gearbox through couplings and adapters.

**BARRELS:** Barrels types are flanged & segmented type and comes with a liner. Barrel material and liner material are selected based on the application, and materials being processed. Tight tolerances are given to ensure proper sealing of the contact surfaces when barrels are assembled.

Barrel types are dependent on their function, e.g. Input barrel, closed barrel, side-feeder barrel, de-volatilizing barrel, combination barrel etc. The system comes with Barrel covers, which helps to prevent heat dissipation.

# SPL40

**Compounding Pelletizing System.**




1. Co-Rotating Twin Screw Extruder
2. Volumetric Feeder
3. Stand Die Head
4. Water Trough
5. Air Knife
6. Strand Pelletizer
7. Classifier

## OTHERS

***FEEDERS:*** Side Feeder: (Optional) Side feeders are often employed in twin-screw extrusion to laterally feed dry materials into the extruder's process section. Side feeders typically have two self-wiping, closely intermeshing screws providing positive conveying of materials. There are multiple advantages associated with the use of side feeders.

***VOLUMETRIC FEEDER:*** Volumetric feeders are used for feeding homogeneously mixed material into the extruder. The material can be flakes, pellets, powders or mix of pellets and powders. The volumetric feeder is controlled by a variable frequency drive.

***STRAND DIE:*** STEER has designed a strand die with high accuracy; in addition to quick disconnect hinged bolts securing the die manifold and die plate. The entire hinge bolt assembly is designed to open by simply turning a common shaft rod that is connected to each hinge bolt. The STEER die is heated via heater cartridges and the entire die assembly is fastened to the extruder via a quick release Jiffy-clamp.

Another key feature of STEER's Die Assembly is its high accuracy. It has chemically heat treated surfaces to overcome the forces of adhesion.

## DOWNSTREAM EQUIPMENT:

***WATER TROUGH:*** A suitable length cooling water trough made from stainless steel for cooling strands. Rollers are provided for guiding the strands through the trough.

***AIR KNIFE:*** Suction type dual head air knife for removing surface moisture from the strands.

***STRAND PELLETIZER:*** STEER offers strand pelletizers from reputed manufacturers capable of cutting strands to pellets of length 3-4 mm.

***CLASSIFIER:*** STEER offers classifiers from reputed manufacturers for fines and over size pellets separation.

# TYPICAL APPLICATIONS USING SPL 40

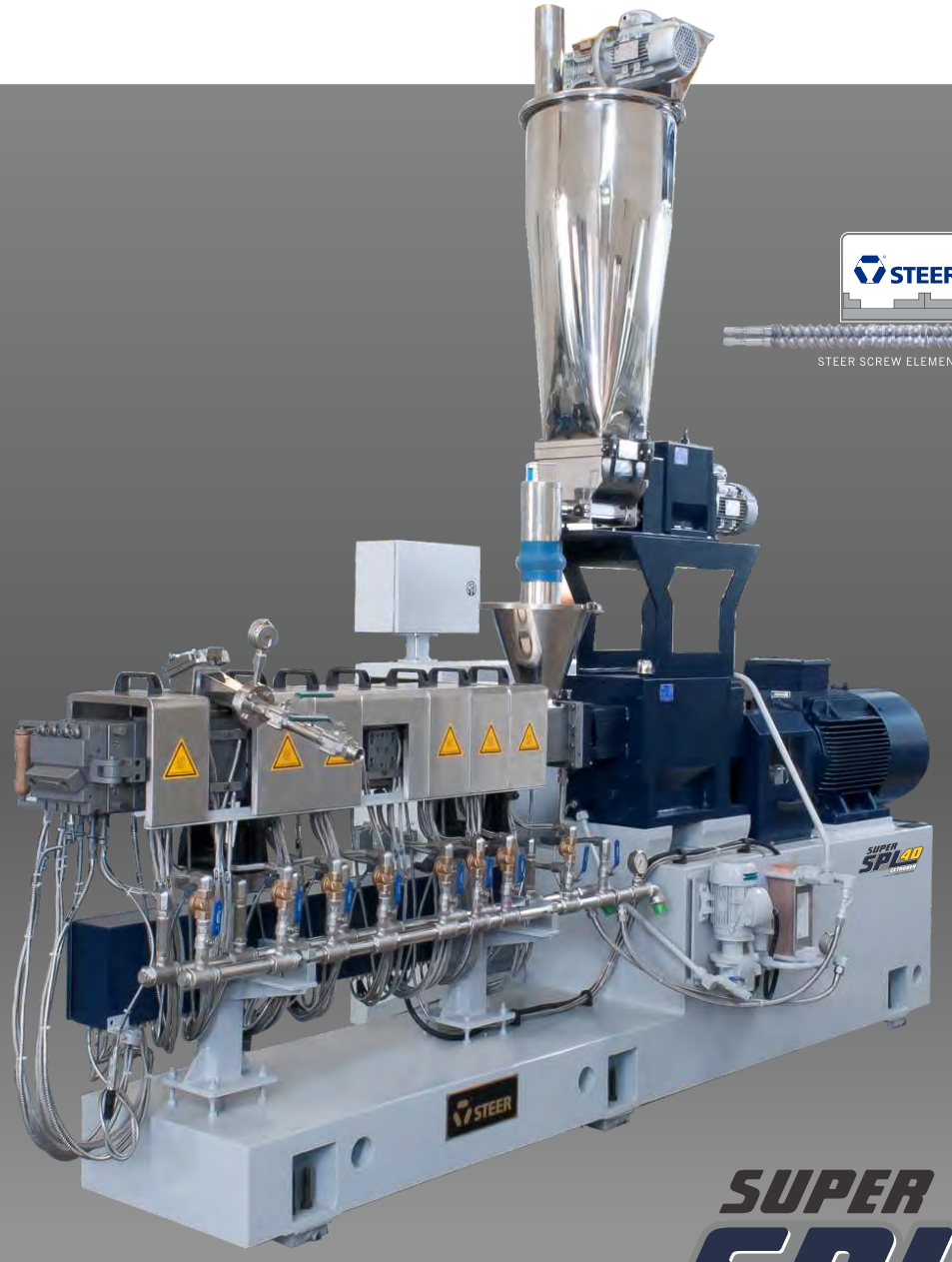
## - WITH MODIFIED POLYOLEFINS & STYRENICS

### *COLOR & PERFORMANCE MASTERBATCHES:*

***Usage:*** The demand for such compounds other than standard products like whites and blacks is mostly in small quantities. Mainly in the manufacturing segments such as pens, stationary items, toys, novelties, gift articles, house-ware and disposables.

### *PRE-COLORED COMPOUNDS FOR AUTO & APPLIANCE PARTS:*

***Usage:*** Most auto interior molded parts are small in size, in dual tones for trims, dashboard components, glove-box, gear console etc. Each car model has over 20 different grades that are needed in small batches by tier 1 & 2 molders. Appliance parts in Polystyrene, ABS & Polypropylene for Consumer Electricals & Electronics which also require small lot production of different grades in colors, tones & hues





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### *MODIFIED PP & HIPS*

***Usage:*** For engineering applications involving reinforcement with minerals for small molded parts in light engineering goods for housings, terminals, switches, casings and claddings.

# *KEY ADVANTAGES OF SPL 40 IN COMPOUNDING OPERATIONS*

- Ideally suited for " Small Lot" production with maximum "First Pass Yield" and minimum Set-Up and Change-over-Time, and minimum wastage during 'start –up & shut-down'
- Robust construction for frequent start-up & shut-down
- Compact design & simple operating process with universal screw configuration resulting in minimum down time & low maintenance
- Effective line for development of new formulations, testing & scale-up for commercial production with reliable reproducibility

# *SPECIFICATIONS*

### *EXTRUDER*

| | |
|---|---|
| Extruder | SPL - 40 |
| Screw diameter (mm) | 40 |
| Do/Di | 1.55 |
| Nominal Torque (Nm/shaft) | 300 |
| Specific Torque (Nm/cm$^3$) | 8 |
| Motor power (kW) | 37 |
| Max. Screw speed (rpm) | 600 |
| L/D Ratio | 40 |
| Side Feeder Option | Available |
| Output** | 100 - 200 kg/h |

### *SIDE FEEDER*

| | |
|---|---|
| Side Feeder is Optional | SF-040 |
| Screw diameter mm | 40 |
| Motor Rating kW | 1.5 |
| Max Screw speed | 600 |
| Feed rate kg/h | 50 to 100 |
| Compatible Extruder | Super 40 |

### *VOLUMETRIC FEEDER*

| | |
|---|---|
| | VF-040 |
| Motor Rating | 1.5 kW |
| Hopper Capacity in Liters | 100 |
| Horizontal agitator | Provided |
| Vertical agitator | Optional for powders |
| Feed rate kg/h | 100 to 400 kg/h |

** Depending on MFI, bulk density, specific energy of the material being processed

SPL40

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MAKING THE DIFFERENCE THROUGH INNOVATIONS

**WWW.STEERWORLD.COM**


**STEER AMERICA**
1525, Corporate Woods Parkway,
Suite 500, Uniontown,
Ohio - 44685, USA

Tel: +1-866-984-1800
Fax: +1-540-526-9144
Email: info@steeramerica.com
Website: www.steeramerica.com

**STEER JAPAN**
Fukui Building 4F, 3-21-7
Higashiueno, Taiko-ku,
Tokyo 111-0015, Japan

Tel: +81-3-6411-5770
Fax: +81-3-3831-3230
Email: info@steerjapan.com
Website: www.steerjapan.com

**STEER EUROPE**
1, Lyric Square,
London W6 0NB,
United Kingdom

Tel: +44-203-178 3243
Fax: +44-203-008 6161
Email: info@steereurope.com
Website: www.steerworld.com

**STEER CHINA**
Suite 405, Building # 3,
3599 Qixin Road, Minhang Area,
Shanghai, China - PRC 201101

Tel: +86-021-34718598
Fax: +86-021-34718598 ext. 806
Email: kenneth.erickson@steerworld.com
Website: www.steerchina.com.cn

**STEER INDIA**
290, 4th Main, 4th Phase,
Peenya Industrial Area,
Bangalore - 560058, INDIA

Tel: +91-80-23723309 / 10
Fax: +91-80-28391374
Email: info@steerworld.com
Website: www.steerworld.com