STEER EXTRUDER COMPONENTS
A GLOBAL CHOICE
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A GLOBAL CHOICE

EXEMPLARY ENGINEERING EXCELLENCE

EPZ.STEERWORLD.COM
With a capacity to make over 50,000 Elements annually, STEER has already supplied over 230,000 Twin-Screw Elements of 9,000+ different types, in about 460 different sizes of twin screw extruders to over 400 plants worldwide. In Japan alone, STEER supplies to about 150 plants.
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THE STEER ADVANTAGE

The LATEST TECHNOLOGY, PROVEN QUALITY, RELIABLE PERFORMANCE with one-stop VALUE-DRIVEN SERVICES has made STEER’s EXTRUDER COMPONENTS truly a GLOBAL CHOICE.

STEER has become an automatic global choice for 'Extruder Users'

Through its dedicated research, technological development, investments in high quality machines, testing equipment and human capital, STEER has geared itself to match the very best in the world.

With a dedicated global team of experts in the field and in its founder Dr. Babu Padmanabhan’s in-depth knowledge of Kinematics, Metallurgy and Polymer Engineering, STEER has further strengthened its already credible standing in the industry.

STEER provides the latest technology

The company holds patents for new screw elements and has established breakthroughs ensuring significant increases in productivity. In several cases, some of our technologically improved Elements & Components have become part of the OEM-equipment. STEER uses hi-tech CAD/CAM programs to manufacture screw elements using basic machine parameters such as barrel-diameter, center distance and constant clearance. The parameters used in designing the elements are completely interchangeable.

STEER elements ensure a fully wiping profile for any lead of screw, any number of starts and any machine parameters. STEER also specializes in the manufacture of High-free Volume Elements, Transition Elements, various types of Kneading Blocks, Lined-Barrels and Shafts to complete its range of EPZ products. The company has independently developed its HITORQ brand of Extruder Gearboxes. In the Gearbox category, STEER’s R&D team has developed an ultra high torque gearbox. STEER’s HI TORQUE Gearbox is an OEM for several global brand of TSEs.

STEER’s Quality is world-class

STEER’s EPZ products are well accepted by its customers for their twin-screw extruder machines - brands such as Coperion, Werner & Pfleiderer, Toshiba, Leistritz, Japan Steel Works, Berstorff, Maris and several others.

STEER supplies its range of EPZ Products to customers in countries like Japan, Korea, Thailand, USA, Italy, Spain, UK, France, Malaysia, Singapore, Mexico, Scotland, Holland, Germany, China, UAE, Israel, Turkey, Saudi Arabia, Brazil, Nepal, Pakistan and India. STEER is an ISO 9001 company that lays maximum emphasis on quality and response time. The company has undertaken process improvement initiatives using Six-Sigma Methodologies.
STEER means Reliable Performance

Reliable performance has been the hallmark of all of STEER's Extruder Components. Wear resistant components are manufactured by analyzing the product composition and the material to be processed, engineering material, metallurgy with optimum composition, hardness and micro structure. The manufacturing challenges are, working on tough-to-machine tool steels.

STEER uses special grades of tool-steel with high wear and corrosion resistance for the processing section. Many of them are developed at STEER's modern foundry. The efficiency parameters are critical and therefore can be enhanced by suitable geometric design of external profiles of the elements configured on the screw shaft, dealing with a very large number of different elements. They are produced by STEER as made-to-order parts with small lead-times.

Designing of components is based on applications, and to provide durability.

Brand STEER is the Global Choice

"Value driven services and one-stop timely supplies". This has made STEER the preferred choice. STEER serves large multi-national companies and key compound and master batch producing companies worldwide. Every order is managed as a project to ensure timely delivery with traceability right from the raw-material stage.

Over the years, STEER has built its own state-of-the-art facilities to manufacture various specifications of elements and components. It has one of India's best in-house foundries as well as research & development center. Its dedicated 'Application Development Center' that conducts tests and trials, and the full-fledged sales-offices in key global markets, are all very much part of the STEER's 'putting the customer first' philosophy.

Choose STEER for all your needs of twin-screw extruder components. To place orders and for further information, please visit our website at www.steerworld.com or contact any of our global offices.
A good compound is the result of the right chemistry coupled with the right technology. This is all about putting the right kind of work, always a result of optimally configured screw elements. Optimal configuration has the right elements in the right place for the right application and process parameters.

The Extruder Processing Zone (EPZ) is the 'heart' of a Co-Rotating Twin-Screw Extruder that helps to achieve the desired performance.

Work done in the Extruder Processing Zone results in the desired quality of compounded material and levels of output in a co-rotating twin-screw extruder. In the EPZ, several actions are carried out on the material as it works its way through the extruder and exits from the die. Depending on the nature of work being carried out, these zones are called Intake, Melting, Atmospheric Venting, Mixing, Vacuum Venting and Metering.

Within this EPZ the 'key to success' lies with the exact design of the 'Element and Barrel' Configuration. STEER Engineering has mastered this art! Continuous innovations and new technologies in making of Screw Elements, Barrels and Shafts have made STEER a global EPZ Specialist. STEER commands over 20% global market share in this category.

Exemplifying Engineering Excellence

STEER EPZ PRODUCTS

STEER inside EPZ

STEER SCREW ELEMENTS • STEER SHAFTS • STEER BARRELS & LINERS
The popular twin-screw elements are newly invented Single Flight Shovel Elements (SFV), Single Flight Elements (SFE), Normal Right-hand Screw Elements (RSE), Schubkanten Elements (SKE), Single Flight SK Elements (SSKE) and Regular Flight Shovel Elements (RFV).

STEER's Shovel elements has been designed for starve-fed and feed limited applications. The supreme conveying efficiency makes this element a preferred choice. It has the ability to handle the materials that tend to get fluidized during flow.

The modular design of the extruder screw assembly provides an option for a wide selection of screw elements for configuring in the 'intake zone'.

Vital Characteristics include free volume, conveying efficiency, and ability to break up and compact.
The melting process in a co-rotating extruder is different. The thermo plastic is subjected to intense shearing. This work in an extruder is done by Kneading Blocks. Multiple lobe geometry is essential in getting the shear uniformity without sacrificing the shear intensification. With this the probability of material getting degraded is reduced.

STEER’s Fractional Kneading Elements have multiple lobe geometry which achieves uniform and intense shear.

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STEER’s Fractional Kneading Elements have multiple lobe geometry. This Kneading Block with multi-lobe geometry enhances the melting efficiency in metallurgy. STEER’s superior materials are designed for all classes of application, and assures enhanced life with balanced mechanical properties.
Zone# 3

VENTING ZONE ELEMENTS

Vents are required to continuously remove air and moisture during or after the melting stage at atmospheric pressure.

Removal of moisture to prevent hydrolysis of condensation polymers such as Nylon and PET is one of the most important requirements. Additionally, downstream to the venting zone, entrapped air may be pumped into the extruder from a side-feeder that needs to be removed in order to increase the capacity of the extruder.

The most important controlling factor affecting the functioning of this zone is the 'Degree of fill' (Dof). Dof is the ratio of actual space (volume) occupied by the material to the actual free space in that particular section of the extruder. The Dof in an extruder is controlled by factors such as extruder speed, feed rate, element design and element configuration.
Zone# 4

MIXING ZONE ELEMENTS

Mixing is an essential function in an Extruder. The Goal of the mixing process in an extruder is to increase the uniformity of the composition.

Efficient mixing results in ingredients to experience the forces of shear, elongation or compression, bending, erosion and impact.

Achieving a chemical union (wetting) of two or more components is an important objective of the compounding process. Use of STEER’s Fractional Elements (US Patent 6783270) in the form of kneading blocks results in higher wetting due to multi-lobe geometry and uniform effect of shear it establishes on the processing material.

Stresses of shear and elongational nature brings about dispersion of the massive agglomerate in the melt polymer matrix. Fractional mixing elements with multi-lobe geometry eliminates meta-radial shear and achieves efficient distributive mixing.
Zone# 5

**VACUUM ZONE ELEMENTS**

Vacuum vents in the barrels are provided in an extruder for removal of gases effectively in a continuous manner at lower than atmospheric pressure.

The degassing helps to conserve the quality of the melt that is affected by the presence of monomers, solvents, moisture and other volatiles. These generally separate from the melt only at those low to high vacuum conditions.

The elements used in this zone exposes the material by continuously thinning the melt for effective degassing. This task of smearing the melt on the barrel surface by thinning for degassing is efficiently exhibited by the long forwarding screw elements or SK type elements.
Zone # 6

METERING ZONE ELEMENTS

The purpose of this Zone is to build required amount of pressure to achieve continuous streamlined output. This zone is also known as the pumping zone.

The compounded polymer melt is transported towards the die by drag flow caused by the rotating screws. Screws with higher degrees of fill with shorter leads are optimum for this zone for creating the pumping effect, thus building up the required pressure.

Metering forms the final processing zone in an Extruder. The function of this zone is to build the required pressure for a continuous streamlined output.
STEER products

SAFTS

STEER manufactures exclusive shafts of required profile and geometry for all makes of Twin-Screw Extruders.

Shafts are for power transmission. Spline Shafts are mostly preferred.

Considering that the nature of splines decides the ability to transmit the power and overcome the forces of extrusion, STEER Shafts are diligently designed. Selection of material is of prime importance for achieving optimum torque capacity.

Superior metallurgy with full fledged in-house heat treatment makes STEER Shafts, the perfect choice.

High accuracy, ability to machine any contour for any length are the other significant strengths of STEER Shafts.

The in-house torque testing facility is of great advantage in rating the capacity.

STEER BREAKAWAY ADAPTER with a V-Notch, is designed to give additional protection. The Adapter works like a fuse in conditions of high torque levels, snapping the adapter to ensure more safety to the EPZ parts and reduce damages.

STEER CONTINUA SPLINE

Its novel design and main features are increased torque capacity with no stress concentration, overcomes the limitation of the conventional involute splines, which is ubiquitous.
STEER manufactures different types of barrels - Intake Barrels, Side Feeder Barrels, Vented Barrels, Combi Barrels and Closed Barrels. The manufacturing is based on the Twin-Screw Extruder configuration and applications as desired by its customers.

STEER also makes Liners for Barrels, depending upon the applications.

STEER has designed cooling circuits in the barrel that cools intensely and uniformly. As a result the efficiency of the process is optimized.

STEER BARRELS have supreme resistance towards various types of wear that are encountered during the extrusion process.

STEER's own sophisticated foundry helps in obtaining the right metallurgy required to make these Barrels and Liners. It offers not only guaranteed high performance but also longer life.

Overall, STEER has excellent infrastructure and expertise to produce and service over 150 Barrels per month.

Material Of Construction (MOC) of Liners are WR3, WR5, WR10, CR5 & WR6.
SIGNIFICANT BENEFITS of STEER BARRELS and LINERS

- Enhanced life
  Due to superior steel and carefully designed metallurgy.

- Optimum heating & cooling
  Uniform and well distributed.

- Super finished surfaces
  For enhanced process efficiency.

- Critically maintained Dimensions and Tolerances
  Geometry is the key.

- Wide choice
  Minimum lead time.

- Global offices
  Better servicing capabilities.

STEER SPECIAL BARRELS

STEER is constantly innovating. It has introduced a 'Novel Technology with a Jiffy Clamp' for Special Extruders. Its objective is to reduce time during assembling/changing and also take care of the forces of expansion during the heating process.

REFURBISHING BARRELS - An Opportunity

STEER undertakes the work of receiving and refurbishing Barrels and Liners to give the product an extended life. Customized metallurgy and highly finished surfaces with high accuracy are the focus areas.
As a specialist in EPZ Products and as one of the leading manufacturers of Co-Rotating Twin-Screw Extruders, STEER constantly invests in R&D to bring out innovative products from time to time. The Special Screw Elements illustrated on this page are an exemplification of its engineering excellence.

**FKB**

**FOR ENHANCED MELTING**

Fractional Lobe Kneading Block
- High melting efficiency.
- Induced melt-mixing.
- Uniform and intense shear.
- Increased overall process efficiency.

**STEER Patent:**
- Ref No. US 6,783,270

**SFV** (Shovel)

**FOR HIGHER INTAKE**

Single Flight Shovel Element
- Starve Feed

These elements are capable of achieving intake capacity (in starve feed) of over 300 per cent compared to normal elements.

Converts feed-limited to torque-limited; utilizing the machine to a great extent.

Improves efficiency of professing by lowering specific energy.

**STEER Patent:** Pending
SPECIAL ELEMENTS

RFV (Shovel)
FOR HIGHER INTAKE (SPECIAL)

Regular Flight Shovel Element
- Shovel Conveying Element.
- Suitable for both intake and side feed zone.
- Increased conveying efficiency.

STEER Patent: Pending

FME
FOR EFFICIENT MIXING

Fractional Mixing Element
- The FME elements offer the ability to avoid the effects of meta radial shear stresses.
- Suitable for mixing and low shear.

STEER Patent:
1. Center Distance: Range is from 10.5 mm to 48 mm depending upon TSE Models.

2. Power Rating: Range is from 3 KW to 300 KW depending upon TSE Models.

STEER HITORQ GEARBOX IS A PERFECT MATCH FOR NEW GENERATION TWIN-SCREW EXTRUDERS.

STEER’s gearbox is oil-cooled and the oil lubrication system includes a heat exchanger, oil filter and oil circulation pump. Protections are built into the system to prevent operation under low oil levels, high oil temperature and low oil pressure.

Thrust washers have longer life. It is achieved with high accuracy, superior metallurgy and unique design. The engineering excellence of STEER gearbox is the result of powerful structure members inside the equipment.

ULTRA HIGH-TORQUE GEARBOX: Through R&D efforts, STEER launched a special ultra high-torque gearbox for the revolutionary OMEGA H CLASS Twin-Screw Extruders. This product can process any tough material and at the same time maximize the output.
STEER TSE FEEDERS

Understanding bulk material is crucial to making an efficient feeder for TSEs. The screw has to be designed based on the type of bulk material i.e., granular, cohesive powders, fibres or flaky materials.

STEER has developed screws appropriate for every application. Hopper designed on bulk material properties overcomes the defects like rathole, arching etc.

Side Feeders are designed to feed a variety of materials like glass-fibres, powder additives, mineral fillers etc., into the extruder. Side feeders can also be used for devolatizing applications through side venting. Side feeder height is adjustable within a range. It is also portable by the use of castor wheels. Barrels and screws are of special tool-steel material and suitably surface treated for the application.

The screws are co-rotating, self-wiping type and the drive is a 4 pole TEFV, Cage type, AC Motor, controlled by a variable speed microprocessor controlled drive control.
The Human Machine Interface (HMI) is the central point for visualization, controlling and monitoring the extruder and peripherals through suitable communication links and protocol. With an HMI system, the drive is controlled from the touch screen of the HMI (Multi Panels or PCs with appropriate pointing devices), which operates through Programmable Logic Controllers (PLCs).

STEER allows for customization of the HMI screens, integration of peripherals, other plant utilities and material system to achieve complete plant automation. The software used by STEER is highly reputed (for example, Siemens Pro Tool/Pro and WinCC or equivalent).

The essential features of the Automation system are recipe management, fail-safe interlocking and data-logging. Recipe management allows for storage of all important process parameters for each product. Interlocks are programmed to provide a safe operation and alarms are generated to alert the operator to take corrective actions. Data-logging allows recording of long or short-term trends and reports can be generated on a daily, weekly or monthly basis based on stored production data.
STEER makes the total Die Assembly unit which suits all processing conditions.

The unit consists of:

- Die Adapter
- Die Head
- Die Plate

It is designed with controlled heating to achieve optimum melt viscosity and building pressure to push the extrudate with ideal viscosity - in the form of strands of required diameter.

One of the key features of STEER’s Die Assembly is its high accuracy. It has chemically heat treated surfaces to overcome the forces of adhesion.
STEER TSE PARTS

SCREW TIPS

STEER manufactures Screw Tips and other related parts for twin-screw extruders.

The salient features include:

- Superior material with high tensile and fatigue properties which ensure longer life.
- Anti-adhesive properties with in-house chemical heat treatment.
- Accuracy in machining.

STEER is equipped to supply Screw Tips for any type of Extruders and is produced based on customer specifications and drawings samples.

SCREEN CHANGERS

STEER also manufactures TSE Screen Changers and other TSE Parts for OEMs and customers as per requirements/specifications.

(Available in 40, 50, 60, 75, 150, 200 mm sizes)
ANNEXURE (i)

- Barrel Specifications
- Processing Zone Metallurgy
- Side Feeder Specifications
- Table of Intake Zone
- Table of Melting Zone
- Table of Mixing Zone
- Material Table

BARREL SPECIFICATIONS

SPECIFICATIONS
Bore Diameter (internal) 10 to 300mm
Barrel Length (each) 50 to 650mm

PROCESSING SECTION METALLURGY

WR1 — Superior resistance towards Adhesive wear
WR2 — High Torque Applications
WR3 — Strength combined with Corrosive Resistance
WR5 — High Abrasive Wear Resistance
WR6 — Excellent performance in Abrasive Wear
CR1 — Corrosive Resistance Stainless Steel
CR2 — Strength combined with Corrosive Resistance
CR5 — Abrasive Wear combined with Corrosive Resistance
CR6 — Supreme Strength with Corrosive Resistant Properties

<table>
<thead>
<tr>
<th>Description</th>
<th>SF - 20</th>
<th>SF - 30</th>
<th>SF - 40</th>
<th>SF - 50</th>
<th>SF - 60</th>
<th>SF - 70</th>
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</thead>
<tbody>
<tr>
<td>Barrel Diameter (mm)</td>
<td>20.5</td>
<td>30.7</td>
<td>41</td>
<td>51.5</td>
<td>62</td>
<td>71.3</td>
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<tr>
<td>Center Distance (mm)</td>
<td>16</td>
<td>24</td>
<td>32</td>
<td>40</td>
<td>48</td>
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<td>Screw Speed (RPM)</td>
<td>600</td>
<td>600</td>
<td>600</td>
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<tr>
<td>Motor Rating</td>
<td>0.37</td>
<td>0.75</td>
<td>1.5</td>
<td>3.0</td>
<td>5.5</td>
<td>11</td>
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<tr>
<td>Capacity Kg/hr</td>
<td>70</td>
<td>240</td>
<td>430</td>
<td>800</td>
<td>1400</td>
<td>2250</td>
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Disclaimer: Due to continuous development actual values / parameters may differ from those mentioned in this list.
<table>
<thead>
<tr>
<th>EPZ ZONES</th>
<th>KEY ACTION</th>
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<tbody>
<tr>
<td>Intake Zone</td>
<td>For introducing the material into the extruder.</td>
</tr>
<tr>
<td>Melting Zone</td>
<td>For heating the material and therefore melting the material and achieve partial or total mixing.</td>
</tr>
<tr>
<td>Venting Zone</td>
<td>For removing the volatiles &amp; moisture.</td>
</tr>
<tr>
<td>Mixing Zone</td>
<td>For ensuring proper mixing.</td>
</tr>
<tr>
<td>Vacuum Zone</td>
<td>For completely removing the volatiles &amp; moisture to the required levels.</td>
</tr>
<tr>
<td>Metering Zone</td>
<td>For building up the required pressure at the die.</td>
</tr>
</tbody>
</table>

### TABLE OF INTAKE ZONE ELEMENTS

<table>
<thead>
<tr>
<th>ELEMENTS</th>
<th>CHARACTERISTICS</th>
<th>POTENTIAL USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOMENCLATURE</td>
<td>GEOMETRY &amp; PROFILES</td>
<td>CONVEYING EFFICIENCY</td>
</tr>
<tr>
<td>Single Flight Shovel Elements**</td>
<td>Highest</td>
<td>Medium</td>
</tr>
<tr>
<td>Single Flight Elements</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Forward Screw Elements</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Schubkanzen Elements</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Single Flight SK Elements</td>
<td>Low</td>
<td>Highest</td>
</tr>
<tr>
<td>Regular Hight Shovel Elements**</td>
<td>Low</td>
<td>Highest</td>
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</table>

### TABLE OF MELTING ZONE ELEMENTS

<table>
<thead>
<tr>
<th>ELEMENTS</th>
<th>CHARACTERISTICS</th>
<th>POTENTIAL USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOMENCLATURE</td>
<td>GEOMETRY &amp; PROFILES</td>
<td>MELTING ABILITY</td>
</tr>
<tr>
<td>Fractional Kneading Element*</td>
<td>Highest</td>
<td>Highest</td>
</tr>
<tr>
<td>Forward Kneading Element</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Reverse Kneading Element</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>3KB Kneading Elements</td>
<td>High</td>
<td>Highest</td>
</tr>
<tr>
<td>Neutral Kneading Elements</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

* Patented  ** Patent Pending
## TABLE OF MIXING ZONE ELEMENTS

<table>
<thead>
<tr>
<th>ELEMENTS</th>
<th>CHARACTERISTICS</th>
<th>POTENTIAL USE</th>
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</thead>
<tbody>
<tr>
<td><strong>Fractional Kneading Elements</strong></td>
<td></td>
<td>Kneading of highly filled materials with Talc, Mica</td>
</tr>
<tr>
<td><strong>Forward Kneading Elements</strong></td>
<td>Medium</td>
<td>General purpose mixing requirement</td>
</tr>
<tr>
<td><strong>Reverse Kneading Elements</strong></td>
<td>Medium</td>
<td>Kneading under Compression</td>
</tr>
<tr>
<td><strong>Neutral Kneading Elements</strong></td>
<td>Low</td>
<td>Intense localised shear or dispersion of agglomerated Pigments</td>
</tr>
<tr>
<td><strong>3KB Kneading Elements</strong></td>
<td>High</td>
<td>A better substitute of RKB for general Purpose Mixing Requirement</td>
</tr>
<tr>
<td><strong>Screw Mixing Elements</strong></td>
<td>High</td>
<td>Use for Fiber dispersion with reduced attrition</td>
</tr>
<tr>
<td><strong>Toothed Block</strong></td>
<td>Medium</td>
<td>Used for distributive Mixing in shallow flighted extruders</td>
</tr>
<tr>
<td><strong>Special Tooth Mixing Elements</strong></td>
<td>High</td>
<td>Used for high stirring action while blending two or three different polymers</td>
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<tr>
<td><strong>CME: Erdmenger Type</strong></td>
<td>Highest</td>
<td>Generally with high clearances between elements, effective in introducing uniform high intensity shear action</td>
</tr>
<tr>
<td><strong>FME - Fractional Mixing Elements</strong></td>
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## MATERIAL OF CONSTRUCTION (MOC)

<table>
<thead>
<tr>
<th>Corrosion resistance</th>
<th>Wear resistance</th>
<th>Hardness Specification</th>
<th>Core HRC</th>
<th>Case HV</th>
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<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>Same as core</td>
<td>41 HRC</td>
<td>Above 900 HV</td>
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<tr>
<td>2</td>
<td>3</td>
<td>Same as case</td>
<td>52 HRC</td>
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<tr>
<td>4</td>
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<td>59 HRC</td>
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<td>3</td>
<td>8</td>
<td>Same as core</td>
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<td>6</td>
<td>7</td>
<td>Same as core</td>
<td>59 HRC</td>
<td>Above 1000 HV</td>
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<td>6</td>
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<td>Same as core</td>
<td>54 HRC</td>
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<td>10</td>
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### Treatment
- Tough & Nitride
- Hardened
- Hardened & Nitride
- HSS

### Raw Material

<table>
<thead>
<tr>
<th>Material Code</th>
<th>Material Description</th>
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<tbody>
<tr>
<td>WR1</td>
<td>34 CrAlN 7</td>
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<tr>
<td>WR2</td>
<td>X 10 CrMoV 5.1</td>
</tr>
<tr>
<td>WR3</td>
<td>X 155 CrMoV 12.1</td>
</tr>
<tr>
<td>WR5</td>
<td>X 240 CrMoV 5.10</td>
</tr>
<tr>
<td>WR5N</td>
<td>X 240 CrMoV 5.10</td>
</tr>
<tr>
<td>WR6</td>
<td>ASP60 (Equivalent)</td>
</tr>
<tr>
<td>WR8</td>
<td>X 20 CrNiM 16.2</td>
</tr>
<tr>
<td>WK1</td>
<td>X 15 CrMoV 12.1</td>
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<tr>
<td>WK2</td>
<td>X 155 CrMoV 12.1</td>
</tr>
<tr>
<td>WK3</td>
<td>X 240 CrMoV 5.10</td>
</tr>
<tr>
<td>WK5</td>
<td>X 240 CrMoV 5.10</td>
</tr>
<tr>
<td>WK6</td>
<td>ASP60 (Equivalent)</td>
</tr>
<tr>
<td>WK8</td>
<td>X 20 CrNiM 16.2</td>
</tr>
<tr>
<td>WK9</td>
<td>X 155 CrMoV 12.1</td>
</tr>
<tr>
<td>WK10</td>
<td>X 240 CrMoV 5.10</td>
</tr>
</tbody>
</table>

### Additional Information
- **41 B Case Nitrided**
- **Core of 40 HRC**
- **AISI H3 Through Hardened**
- **AISI D2 Through Hardened**
- **AISI A11 Through Hardened**
- **AISI 440C hardened**
- **Mechanical Technology**

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**MATERIAL TABLE**

- **Steel Code**: WR1, WR2, WR3, WR5, WR6, CR1, CR5, CR8, CR9, AC8, AC9, WR10
- **Material**: Steel, Acrylonitrile, etc.
SHOVEL ELEMENTS
STEER SFV ELEMENTS

The snow plough with a shovel comes to the rescue of co-rotating twin-screw extruder applications. The STEER SFV Screw Elements are capable of achieving intake capacity of over 300 per cent (in STARVE FEED) compared to normal screw elements. Certain applications specially powder feeding requirements are greatly benefitted by this breakthrough.

The SHOVEL ELEMENTS (SFV Screw Elements) are an integral part of some of STEER’s Generation Next Co-rotating Twin-Screw Extruder brands.
When it comes to special applications and difficult materials the STEER SPECIAL SCREW ELEMENTS RFV, SFV, FME and FKB are the most preferred choices. The difference is in technology to achieve reduced shearing and enhanced mixing.

**Higher Intake, Enhanced Mixing, Efficient Conveying.** A good compound is the result of the right chemistry coupled with the right technology. It is all about putting the right kind of work, always a result of optimally configured screw elements. When it comes to unique applications and compounding of difficult applications what comes to the rescue are the STEER’s Special Elements.

**Regular Flight Shovel Element (RFV)***, Single Flight Shovel Element (SFV)**, Fractional Mixing Element (FME)* and Fractional Lobe Kneading Block (FKB)* are examples of the many Special Elements that are innovated by STEER.
No.1.
AT THE HEART OF A CO-ROTATING TWIN SCREW EXTRUDER.

STEER serves over 15% of the world market with EPZ parts, through its global network and customised services.

Scaling new heights, STEER EPZ is now a global choice for Extruder Processing Zone parts; Twin-Screw Elements, Shafts, Barrels and Liners. With a capacity to make over 50,000 screw-elements annually, STEER has supplied over 230,000 TSE Elements of 9000+ different types of about 460 different sizes of TSEs to over 400 plants worldwide. Exemplifying engineering excellence, STEER has pioneered special elements like FKB, SFV, RFV and FME, all of which have gained much popularity in the industry.

Manufactured using special grades of tool-steel with high wear and corrosion resistance for the processing section, the alloy is developed at STEER’s state-of-the-art foundry. An advanced Computer Aided Design and CNC aided facility completes the manufacturing process of these next generation elements designed to achieve the desired performance.
STEER manufactures different types of Barrels namely Intake Barrels, Side Feeder Barrels, Vented Barrels, Combi Barrels and Closed Barrels (round or square). STEER’s sophisticated foundry and expertise provides the assurance that the right metallurgy is in place to make Barrels and Liners. STEER constantly innovates and has introduced a ‘Novel Technology with a Jiffy Clamp’ for Special Extruders. STEER also provides Barrel Relining Services and on-site Barrel Measurement Services.

STEER makes exclusive shafts of any profile and geometry for all brands of Twin-Screw Extruders. Superior metallurgy with full fledged in-house heat treatment makes STEER Shafts a perfect choice. STEER also provides services to test the shafts of any make.
STEER EPZ Services

[See: epz.steerworld.com/services.php]

STEER provides quality service in the following areas:

- Screw Element Configuration
- Barrel Measurement Activities
- (Consulting Services)
- Safety Adaptor for Shafts
- Screw Elements Replacements
- Shaft Testing Services
- Barrel Relining Services

Element Configuration:
STEER provides consultation for the configuration of elements required in various applications. The expertise of STEER comes from the wide range of experience in different applications running and the R & D work at the Applications Development Center (ADC) in STEER.

Barrel Relining:
STEER undertakes the complete task of refurbishing Barrels and Liners to give the extruders an extended life. The manufacturing is based on the Twin-Screw configuration and applications as desired by its customers.

Shaft Testing:
STEER provides services to test the shafts of any make. A comprehensive check ensures that the shaft used in the extruder is ready to handle the require amount of torque, thereby ensuring optimal usage.

Safety adaptor for shaft of other machines:
The safety adaptor provided by STEER ensures that your shaft remains immune to the torque imbalances at the time of extruder start-up and stoppages.

Elements Replacement:
STEER provides a wide array of EPZ elements, custom built to suit any extruder and any application.

Barrel Measurement:
STEER provides on-site barrel measurement services.
AN EXAMPLE OF A TSE WITH SOME OF STEER EXTRUDER COMPONENTS:
(1) HMI  (2) GEARBOX  (3) FEEDERS (4) EPZ WITH BARREL ASSEMBLY (5) DIE ASSEMBLY
No.1. **AT THE HEART OF A CO-ROTATING TWIN-SCREW EXTRUDER**

The Extruder Processing Zone (EPZ) is the ‘heart’ of a co-rotating twin-screw extruder that helps to achieve the desired performance. In the EPZ product portfolio, STEER’s EPZ brand is aggressive with its patented screw elements and innovations in shafts and barrels. STEER has its own state-of-the-art foundry to manufacture specialty tool steels and has supplied over 230,000 TSE Elements to more than 400 plants worldwide.

Higher Intake, Enhanced Mixing and Efficient Conveying are the three important activities that are performed INSIDE the processing zone of a co-rotating twin-screw extruder. A compound is the result of the right chemistry coupled with the right technology. Repeat purchases by its customers and increasing numbers of new customers have helped STEER reach a commanding position in the EPZ category of the growing world extruder market. STEER also provides a host of EPZ services for all brands of co-rotating twin-screw extruders through its wide global network of offices and service representatives.

**STEER EPZ - THE PREFERRED CHOICE OF OVER 5500 OPERATING EXTRUDERS WORLDWIDE**
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STEER EPZ - THE PREFERRED CHOICE OF OVER 5500 OPERATING EXTRUDERS WORLDWIDE
# CUSTOMER ENQUIRY FORM

CUSTOMERS ARE REQUESTED TO FILL UP THIS FORM TO INDICATE THEIR INTERESTS.

## I. Extruder Details

<table>
<thead>
<tr>
<th>Make / Type</th>
<th>Model No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L/D Ratio</td>
<td>Center Distance</td>
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</tbody>
</table>

Existing Configuration
(Please attach a separate sheet)

Desired Configuration

Material of Construction

Drawings

Samples

## II. Screw Elements

Existing Configuration
(Please attach a separate sheet)

Desired Configuration

Material of Construction

External Finish

|               | ☐ Grit Blast | ☐ Bright | ☐ Hard Chrome Plated |

Drawing

Samples
### III. Shafts

<table>
<thead>
<tr>
<th>Type</th>
<th>Involute</th>
<th>Cycloidal</th>
<th>Flat keyway</th>
<th>Spline</th>
<th>Others</th>
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<table>
<thead>
<tr>
<th>Material of Construction</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Direction of rotation as seen from die end towards the machine</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Type of Gearbox side Coupling to mount</td>
<td>Involute</td>
<td>Cycloidal</td>
<td>Flat keyway</td>
<td>Spline</td>
<td>Others</td>
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<tr>
<td>Shaft RPM</td>
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<td>Motor RPM</td>
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<td>Samples</td>
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### IV. Barrels

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<tr>
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<th>Cladded</th>
<th>Round</th>
<th>Rectangular</th>
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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Cooling holes</td>
<td>Yes / No</td>
<td>Heating arrangement</td>
<td>Cartridge / other</td>
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<tr>
<td>No. of Vent / Intake barrels</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No. of Combi barrels</td>
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<tr>
<td>Drawings</td>
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<tr>
<td>Samples</td>
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</tbody>
</table>

For Office Use

For more information, please contact any of our global offices:

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