Introducing Esteves Group

Esteves Group is the world’s leading manufacturer of high precision wire drawing dies, cabling dies, and extrusion tooling for the wire and cable industry. Customers count on our customized tooling to manufacture products and components found all around us in modern day life. Some of these products and components are electrical wiring, communication cables, bonding wire used in cell phones and computers, saw wire for slicing silicon wafers for solar panels, cables used in the aerospace industry, and medical devices such as stents and hypodermic needles. Additionally our tooling is used in the manufacture of welding wire, nails, staples, fasteners, and concrete reinforcement rods that are used to hold together our houses, cars, roads, and skyscrapers.

As a supplier of tooling for your drawing and cabling processes, Esteves Group is committed to a long-term relationship and is a proven partner with a clear vision of service. Our main vision is to understand your goals and expectations in order to provide you with the products and services that completely meet your requirements.

With strategically located manufacturing plants in Europe, North and South America, and Asia, Esteves Group’s local service representatives are just one email or phone call away from helping you.

Esteves Group manufactures tooling with ultra-hard inserts for the wire and cable industry. Below is a partial listing of products that are offered by Esteves Group. Check www.estevesgroup.com or contact your local representative for more details.

Wire drawing dies
- Round wire drawing dies
- Recut dies
- Elongation sets
- Shaped profile wire drawing dies
- Shaving dies
- Guide dies

Cabling tools
- Bunching, stranding and compacting dies
- Split dies
- Extrusion tips and dies

Miscellaneous tooling
- Tubing dies
- Conform dies
- Wipe dies
- Coated dies
- Enameling dies
- Eye-lets

Specialty products
- Calibrating dies
- Spray jet and gas injection nozzles
- Micro-pierced products
- Fiber optic coating dies
- EDM guides
- Go/no-go gages

Die shop equipment and supplies
- Ultrasonic polishing machinery
- Wire polishing machinery
- Wire pullers
- Die and extrusion tool cleaning systems
- Microscopes
- Consumables
- Ancillary equipment
- Check pins
Industries

Powering the future
The vast majority of our world is powered by electricity. Whether it comes from new green-energy sources such as wind mills and solar panels, or coal and nuclear powered plants, it has to be efficiently transmitted to where it is needed. This is done through high, medium and low voltage cables, from complex multi-conductor cabling below our cities to the single wires that power our houses and industries. Esteves Group’s drawing, cabling and extrusion products play an essential part in reducing costs in the production of these wires and cables.

Moving forward
Since the advent of the mass produced automobile, Esteves Group has been at the forefront of supplying drawing dies and extrusion tools for the automotive industry. We are globally recognized as a certified supplier to many leading automotive wire manufacturers. Whether the application is strong tire cord to reinforce car tires, wire used to make fasteners, smaller lighter thin-wall wire harnesses to power the electrical parts in a car, or flat cabling for onboard computer and communication equipment, Esteves Group is fully committed to the automotive industry.

Adding quality and value to life
Today you’ll find products that are powered by wire made with Esteves Group drawing and extrusion tools all around you. From cell phones and MP3 players to tablets and computers, our products are used to manufacture the ultra-fine wires that are helping them become smaller, thinner, lighter, more reliable, and energy efficient.

Moving mankind around the world and beyond
Since the dawn of commercial air and spaceflight, wires and cables manufactured with Esteves Group products have been onboard. The many miles of wiring, and thousands of high strength low weight fasteners found in all air and spacecraft are made possible with our tools. Esteves Group is globally recognized as a certified supplier to many leading suppliers of the aerospace industry.

Products that save lives
Minimally invasive surgical products, stents, hypodermic needles and many other medical products depend on various wire and tube materials for their existence. Esteves Group is well known in the medical wire and tube business for its high precision wire drawing dies. From stainless steel to nitinol and titanium alloys, leading manufactures count on us to produce dies that meet the demanding size, material, and surface specifications of today’s medical devices.

Meeting the unique demands of the welding consumable industry
The world of welding wire consumables has grown dramatically in both number of applications, and materials available to meet the demands of those applications. Esteves Group supplies engineered wire drawing dies and strings designed to maximize die life and improve wire surface condition while increasing process speeds and minimizing cast and helix issues.

Building tomorrow’s infrastructure
The modern building and construction industry counts on high speed fastener application systems to lower cost, and increase strength and quality. They are also increasingly using concrete steel reinforcing fibers to dramatically increase its strength. Esteves Group is a leading manufacturer of wire dies for construction related wire. Nails, staples, fasteners, and steel fibers have long been made with our dies.

Enabling high-speed and low-cost data communication
Today’s modern data communication cables are connecting more and more people, homes and businesses all around the world. They range from single-shielded copper wires to deep-sea optical fiber cables that use stranded steel wires to protect them. New technology has allowed these cables to carry ever increasing amounts of data at faster speeds. Manufacturers of these cables count on Esteves Group’s wire drawing, cabling and extrusion tooling solutions to keep them on the cutting edge of their industry.
Wire Drawing Dies

Esteves Group drawing dies are renowned for their quality, reliability, and extraordinary value in a wide and diverse variety of rod and wire drawing applications. To meet all market requirements, Esteves Group offers a large selection of dies for drawing rod and wire, from ultra-fine bonding wires to intermediate and rod size wires.

Count on successfully using our diamond and carbide wire drawing dies for all types of bare or plated ferrous and non-ferrous wires.

### Matched Elongation Die Sets

Today's high speed multi-wire drawing machines require maximum wire die precision.

Die strings are specifically designed and manufactured to match the mechanical draft of your machine. This ensures maximized die life and increased throughput and uptime.

The diameter of the finish die in the series is correlated to your finished wire size requirements.

Ask our sales professionals to help you minimize wire breaks.

### Products

#### Benefits

- Optimal die material selection for your process
- Optimal die profile, engineered to your process
- Tapered draft engineering available
- Elongation set engineering available
- Homogeneous wire deformation

#### Wire Drawing Dies

**Exitus Group drawing dies are renowned for their quality, reliability, and extraordinary value in a wide and diverse variety of rod and wire drawing applications. To meet all market requirements, Exitus Group offers a large selection of dies for drawing rod and wire, from ultra-fine bonding wires to intermediate and rod size wires.**

Count on successfully using our diamond and carbide wire drawing dies for all types of bare or plated ferrous and non-ferrous wires.

**Tungsten Carbide (TC)**

TC dies are an excellent option for manufacturing ferrous rod-size wires, and for relatively short production and trial runs. Tungsten carbide blanks have extreme density, hardness, and strength. Drawing dies are available in all round sizes. Special shape dies including, but not limited to, oval, square, triangle or hexagon design can be made to order. Split-die configurations are also available.

**Synthetic Single Crystal Diamond (SSCD), Natural Diamond (ND)**

SSCD and ND dies are an excellent option for manufacturing fine and ultra-fine wires. Single crystal diamond dies provide superior quality, hardness, accuracy and a long service life for each die. They yield precision wire with an excellent surface finish, enabling high drawing performance and low power usage due to low friction.

**Polycrystalline Diamond (PCD)**

PCD dies are ideal for long production runs and for drawing abrasive wire materials as they outlast TC, SSCD and ND dies. Polycrystalline diamond dies are available in various grains sizes, both in supported and unsupported configurations. Thermally stable blanks are available for high temperature applications. PCD dies provide uniform hardness and extended wear resistance in all directions.

### Matched Elongation Die Sets

- Elongation set tailored to your machine
- Reduced wire breaks
- Maximized die life
- Effortless multi-wire string-up
- Reduced capstan wear

#### Drawing Die Recutting / Refurbishing / Repolishing / Resizing

At Exitus Group, we have spent years developing refurbishing processes that have helped the wire drawing industry reduce cost. This experience delivers recutting, repolishing, and resizing capabilities that fully recover and sometimes enhance the initial drawing die performance. You can count on us to find the most cost effective solution for your die recutting needs.

Exitus Group die refurbishing is available for all types of diamond and carbide drawing dies, regardless of the original manufacturer.
Bunching, Stranding and Compacting Dies

Esteves Group stranding products have well blended profiles and highly polished surfaces enabling superior performance and cable quality. A wide variety of materials are available for you to choose from to meet your cabling requirements.

Benefits
- Optimal die profile, tailored to your process
- Available in a wide size range
- Superior performance and cable quality

<table>
<thead>
<tr>
<th>Product name</th>
<th>Bunching Die</th>
<th>Stranding Die</th>
<th>Compacting Die</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tungsten Carbide (TC)</td>
<td>≥ 0.127 mm .005&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamond Coated Tungsten Carbide (TC)</td>
<td>8 – 77 mm 315 – 3.03&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polycrystalline Diamond (PCD)</td>
<td>Up to 35 mm 1.38&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Crystal Diamond (SSCD/ND)</td>
<td>Up to 1.5 mm .059&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard tolerance</td>
<td>Tolerance depends on hole diameter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available angles</td>
<td>Matched to stranding process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard angle tolerance</td>
<td>± 2°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Split Dies

Made in a wide range of configurations and designs, split dies can dramatically cut your setup time by eliminating the need to restring a stranding or cabling machine when changing sizes. Split dies allow for quick changeovers without cutting the wire, providing ease of use and higher throughput.

Benefits
- Dramatically cut your setup time
- Eliminates restringing
- Optimal die profile, tailored to your process
- Available in a wide size range

<table>
<thead>
<tr>
<th>Product name</th>
<th>PCD Split Die</th>
<th>TC Split Die</th>
<th>Steel Split Die</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available sizes</td>
<td>3.50 – 10 mm .138 – 1.00&quot;</td>
<td>≥ 0.50 mm .020&quot;</td>
<td>Made to order</td>
</tr>
<tr>
<td>Standard tolerance</td>
<td>Tolerance depends on hole diameter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available angles</td>
<td>Matched to stranding process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard angle tolerance</td>
<td>± 2°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blank (nib) material</td>
<td>Polycrystalline Diamond</td>
<td>Tungsten Carbide</td>
<td>Hardened Steel</td>
</tr>
</tbody>
</table>

Diamond Coated Bunching, Stranding and Compacting Dies

Ultra-smooth wire and cable surfaces with excellent conductivity are achieved through the use of Esteves Group diamond coated dies, enabling you to reduce costs. A diamond coated die is the ideal combination of large-size availability of tungsten carbide and the ideal surface properties of synthetic diamond. Possible material savings and lower power usage add up to more profit for your stranding process.

Benefits
- Conductor wire or cable material savings
- Reduced power usage
- Long diameter stability
- High machine uptime
- Excellent wire and cable surface

<table>
<thead>
<tr>
<th>Product name</th>
<th>Diamond Coated (DC) Die</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available sizes</td>
<td>8 – 77 mm 315 – 3.03&quot;</td>
</tr>
<tr>
<td>Standard tolerance</td>
<td>Tolerance depends on hole diameter</td>
</tr>
<tr>
<td>Available angles</td>
<td>Matched to stranding process</td>
</tr>
<tr>
<td>Standard angle tolerance</td>
<td>± 2°</td>
</tr>
<tr>
<td>Blank (nib) material</td>
<td>Tungsten Carbide (TC) coated with diamond layer</td>
</tr>
</tbody>
</table>

Shaped Profile Drawing Dies

Esteves Group shaped dies are customized to match your requirements and are available in virtually any form. Shapes include square, rectangular, hexagonal, triangular, oval, half-round, triobular, transmission cable, and trolley wire. Additionally we can help you with engineering the series of dies that will gradually transform your wire or rod from one shape into another. Let us know your shaped rod or wire requirements and have our specialists design the series for you.

Benefits
- Gradually deform from one shape into another
- Die set engineering available
- Tight dimension tolerances
- Superior rod and wire finish

<table>
<thead>
<tr>
<th>Product name</th>
<th>TC Shape Die</th>
<th>PCD Shape Die</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available sizes</td>
<td>≥ 0.6 mm .0236&quot;</td>
<td>≥ 0.1 mm .0039&quot;</td>
</tr>
<tr>
<td>Available shapes</td>
<td>Virtually any shape is available</td>
<td></td>
</tr>
<tr>
<td>Standard tolerance</td>
<td>+0/-1.5% of the hole diagonal</td>
<td></td>
</tr>
<tr>
<td>Available angles</td>
<td>8 – 28°</td>
<td></td>
</tr>
<tr>
<td>Standard angle tolerance</td>
<td>± 2°</td>
<td></td>
</tr>
<tr>
<td>Blank (nib) material</td>
<td>Tungsten Carbide (TC)</td>
<td>Polycrystalline Diamond (PCD)</td>
</tr>
</tbody>
</table>
Extrusion Tools
Esteves Group’s superior extrusion tool concentricity allows you to meet the demands of today's super thin-wall constructions by maintaining uniform insulation thickness, minimizing material usage and scrap. Super-hard material inserts in the wire guides, primarily diamond and carbide, ensure long tool life even at high extrusion process speeds. Virtually any extrusion tooling shape for any type of crosshead is available from Esteves Group. Contact us to discuss your extrusion tool requirements.

Benefits
- Insulation material savings
- Even insulation thickness all around
- Wire perfectly centered within insulation material
- Optimal insulation flow
- Long lasting tools

### Extrusion tip (extrusion wire guide) specifications

<table>
<thead>
<tr>
<th>Product name</th>
<th>Diamond insert tip</th>
<th>Tungsten Carbide insert tip</th>
<th>Solid Tungsten Carbide tip</th>
<th>Solid Steel tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size range</td>
<td>0.25 – 1.90 mm .0098 – .075&quot;</td>
<td>0.7 – 5.0 mm .0276 – .197&quot;</td>
<td>1.20 – 8.0 mm .047 – .315&quot;</td>
<td>1.0 – 35 mm .039 – 1.38&quot;</td>
</tr>
<tr>
<td>Insert material</td>
<td>Diamond (PCD, SSSCD, ND)</td>
<td>Tungsten Carbide (TC)</td>
<td>Solid Tungsten Carbide (TC)</td>
<td>Solid Steel</td>
</tr>
<tr>
<td>Body material</td>
<td>Steel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to product tip</td>
<td>≥ 0.6 mm</td>
<td>0 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentricity</td>
<td>= 0.005 mm .000197&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Extrusion die specifications

<table>
<thead>
<tr>
<th>Product name</th>
<th>Solid Tungsten Carbide die</th>
<th>Tungsten Carbide insert die</th>
<th>Ceramic insert die</th>
<th>Solid Steel die</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size range</td>
<td>0.8 – 8.0 mm .031 – .315&quot;</td>
<td>0.8 – 8.0 mm .031 – .315&quot;</td>
<td>≥ 2.0 mm .0787&quot;</td>
<td>8.0 – 35 mm .315 – 1.38&quot;</td>
</tr>
<tr>
<td>Insert material</td>
<td>Solid Tungsten Carbide (TC)</td>
<td>Tungsten Carbide (TC)</td>
<td>Ceramic</td>
<td>Steel</td>
</tr>
<tr>
<td>Body material</td>
<td>Steel</td>
<td>Steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentricity</td>
<td>= 0.005 mm .000197&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Engineering and consulting services
Since Esteves Group is strategically located throughout the world, you can rely on close cooperation and advanced die technology wherever you are.
We understand the challenges you face when considering new or improving drawing and cabling solutions. You need the best partner you can get and at Esteves Group, that’s precisely what we deliver.
Esteves Group’s main vision is to understand your goals and expectations in order to provide you with the products and services that best meet your requirements.
Whatever your application, you can rely on Esteves Group to leverage our technical expertise and extensive tooling experience to deliver the tools you need to keep your business successful.

Inventory stocking and die shop services
Let us help your company streamline your die logistics with a program custom designed for you.
Whether it is a simple Kanban stocking system, recut die inventory at our location, or an integrated package of inventory at both your location and ours, we can help your company to efficiently manage your die and die maintenance needs.
Esteves Group also provides die maintenance solutions including helping you organize your die shop.

Die design software
Drawing Die Wizard™ is a complementary configuration tool that is available from Esteves Group to help you select the right drawing die blank and required die profile.
The software accurately replicates the important characteristics of your wire drawing die in 2D or 3D. By simply entering data, the software will pre-select a drawing die blank and design a die profile in real-time.
This tool is available as a free download from: www.estevesgroup.com

Delivery logistics matching your needs
DEX, an Esteves Group Express service, is a service that we provide for our customers to ensure we deliver your tooling when needed, even when this involves less than 1 week lead-times.
Through planned and reserved capacity, stocking programs and communication between your staff and ours, we can meet your urgent die requirements.
Please contact your representative at Esteves Group for details on how we can help you.

Die seminars and die shop training
Several courses are available from Esteves Group that can be organized either within your company or within our factories. At our factory we invite you to view our manufacturing process and see how your tools are being made. We have several courses available for you to choose from:

- Die basics; Learn what drawing dies are and how they are used
- Die usage; Learn how to successfully use wire drawing dies
- Die evaluation; Hands-on training to learn how to evaluate dies and analyze wear
Esteves Group develops and manufactures tooling with exceptional performance and outstanding quality for the wire and cable industry.

As a supplier of tooling for your drawing and cabling process, Esteves Group is committed to a long-term relationship and is a proven partner with a clear vision of service. Our main vision is to understand your goals and expectations in order to provide you with the products and services that completely meet your requirements.

Esteves Group is a subsidiary of Diamond Tools Group, a privately owned company specialized in the production of precision diamond and super-hard material tools.
Visit www.estevesgroup.com to find detailed information about all products and services that Esteves Group offers.

Follow Esteves Group:

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