



ESTEVES
GROUP



wire die solutions



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.

 > USA (Decatur, IN)

 > Spain (Barcelona)

 > Mexico (Querétaro)

 > China (Shanghai)

 > Brazil (São Paulo)



Capabilities

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



Energy

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.

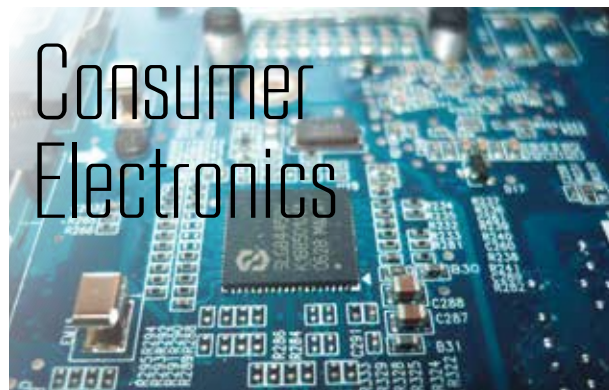
Esteves Group's drawing, cabling and extrusion products play an essential part in reducing costs in the production of these wires and cables.



Automotive

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.



Consumer Electronics

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.

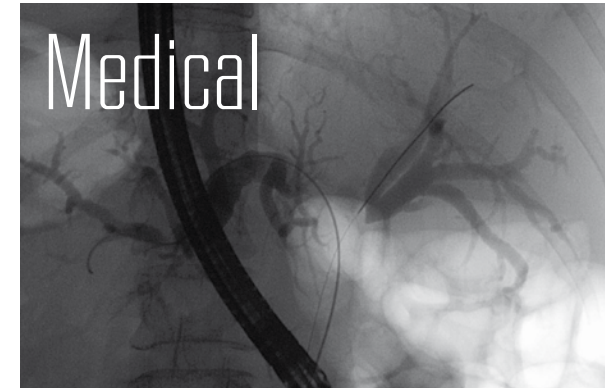


Aerospace

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.



Medical

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.



Welding

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 & Construction

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.



Communication & Data

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.

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

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.

Product name	TC Die	PCD Die	SSCD Die	ND Die
				
Standard size range	≥ 0.127 mm ≥ .005"	0.040 – 35 mm .00157 – 1.378"	0.007 – 2.15 mm .00028 – .0840"	0.007 – 2.00 mm .00028 – .0787"
Standard tolerance	Tolerance depends on hole diameter			
Standard angle range	8 - 28° (other angles available upon request)			
Standard angle tolerance	± 2° (tighter tolerances available upon request)			
Blank (nib) material	Tungsten Carbide	Polycrystalline Diamond	Synthetic Single Crystal Diamond	Natural Diamond

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.

Benefits

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



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.



Benefits

- Drawing die cost savings by re-using your dies
- Die wear feedback, die usage report available
- Fast turn-around time
- Easy ordering, one price per size

Drawing Die Recutting / Refurbishing / Repolishing / Resizing

At Esteves 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.

Esteves Group die refurbishing is available for all types of diamond and carbide drawing dies, regardless of the original manufacturer.



Benefits

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

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.



	Product name	Bunching Die	Stranding Die	Compacting Die
Standard size range	Tungsten Carbide (TC)		≥ 0.127 mm .005"	
	Diamond Coated Tungsten Carbide (TC)		8 – 77 mm .315 – 3.03"	
	Polycrystalline Diamond (PCD)		Up to 35 mm 1.38"	
	Single Crystal Diamond (SSCD/ND)		Up to 1.5 mm .059"	
	Standard tolerance	Tolerance depends on hole diameter		
	Available angles	Matched to stranding process		
	Standard angle tolerance	± 2°		

Benefits

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

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.



Product name	PCD Split Die	TC Split Die	Steel Split Die
Available sizes	3.50 – 10 mm .138 – 1.00"	≥ 0.50 mm ≥ .020"	Made to order
Standard tolerance	Tolerance depends on hole diameter		
Available angles	Matched to stranding process		
Standard angle tolerance	± 2°		
Blank (nib) material	Polycrystalline Diamond	Tungsten Carbide	Hardened Steel

Benefits

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

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.



Product name	Diamond Coated (DC) Die
Available sizes	8 – 77 mm .315 – 3.03"
Standard tolerance	Tolerance depends on hole diameter
Available angles	Matched to stranding process
Standard angle tolerance	± 2°
Blank (nib) material	Tungsten Carbide (TC) coated with diamond layer

Benefits

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

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, trilobular, 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.



Product name	TC Shape Die	PCD Shape Die
Available sizes	≥ 0.6 mm ≥ .0236"	≥ 0.1 mm ≥ .0039"
Available shapes	Virtually any shape is available	
Standard tolerance	+0/-1.5% of the hole diagonal	
Available angles	8 - 28°	
Standard angle tolerance	± 2°	
Blend and radius	Blends between profile parts depend on required shape	
Blank (nib) material	Tungsten Carbide (TC)	Polycrystalline Diamond (PCD)

Benefits

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

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.

Extrusion tip (extrusion wire guide) specifications

Product name	Diamond insert tip	Tungsten Carbide insert tip	Solid Tungsten Carbide tip	Solid Steel tip
Size range	0.25 – 1.90 mm .0098 – .075"	0.7 – 5.0 mm .0276 – .197"	1.20 – 8.0 mm .047 – .315"	1.0 – 35 mm .039 – 1.38"
Insert material	Diamond (PCD, SSCD, ND)	Tungsten Carbide (TC)	Solid Tungsten Carbide (TC)	Solid Steel
Body material	Steel			
Distance to product tip	≥ 0.6 mm ≥ .0236"	0 mm 0"		
Concentricity	± 0.005 mm .000197"			

Extrusion die specifications

Product name	Solid Tungsten Carbide die	Tungsten Carbide insert die	Ceramic insert die	Solid Steel die
Size range	0.8 – 8.0 mm .031 – .315"	0.8 – 8.0 mm .031 – .315"	≥ 2.0 mm ≥ .0787"	8.0 – 35 mm .315 – 1.38"
Insert material	Solid Tungsten Carbide (TC)	Tungsten Carbide (TC)	Ceramic	Solid Steel
Body material		Steel	Steel	
Concentricity	± 0.005 mm .000197"			



Wire Types

	Drawing dies	Matched elongation sets	Reverts	Shape profile dies	Bunching, stranding & compacting dies	Diamond coated (DCC) dies	Extrusion tools	Miscellaneous & specialty tooling
Aluminum alloy wire	●	●	●	●	●	●	●	
Aluminum bonding wire	●	●	●					
Aluminum wire	●	●	●	●	●	●	●	
Aluminum-clad steel wire (ACS)	●		●	●	●			
Bare copper wire	●	●	●	●	●	●	●	●
Brass wire	●	●	●	●	●			
CO ₂ welding wire	●		●					
Coated copper wire	●	●	●	●	●	●	●	●
Copper bonding wire	●	●	●					
Copper-clad aluminum wire (CCA)	●		●	●	●	●		
Copper-clad steel wire (CCS)	●		●	●	●	●		
Enameled copper wire	●	●	●	●				●
Flux cored welding wire	●		●					
Galvanized wire	●		●	●				
Gold bonding wire	●	●	●					
High carbon steel wire	●		●	●				
Lead wire	●		●					
Lead-in wire	●	●	●					
Low carbon steel wire	●		●	●	●			
Medium carbon steel wire	●		●	●	●			
Nitinol wire	●	●	●	●				
Platinum wire	●	●	●	●				
Saw wire	●		●					
Silver wire	●	●	●	●				
Stainless steel wire	●		●	●	●			
Titanium wire	●	●	●	●				

Services

No.	Diameter	Angle	Bearing	Ø%	Δ%	Blank
0	1.8					
1	1.614	18	25	24.38	19.60	D15-N 5
2	1.438	18	25	25.98	20.62	D15-N 5
3	1.281	18	25	26.01	20.64	D15-N 5
4	1.142	18	25	25.82	20.52	D15-N 5
5	1.017	18	25	26.09	20.69	D12-N 5
6	0.906	18	25	26.00	20.64	D12-N 5
7	0.807	18	25	26.04	20.66	D12-N 5
8	0.719	18	25	25.98	20.62	D 6-N 5
9	0.641	18	25	25.82	20.52	D 6-N 5
10	0.571	18	30	26.02	20.65	D 6-N 5
11	0.519	18	30	21.04	17.38	D 6-N 5
12	0.472	18	30	20.91	17.29	D 6-N 5
13	0.429	18	30	21.05	17.39	D 6-N 5
14	0.39	18	40	21.00	17.36	S 8
15	0.354	18	40	21.37	17.41	S 8
16	0.322	18	40	20.86	17.26	S 8
17	0.293	18	40	20.77	17.20	S 8
18	0.266	18	40	21.38	17.38	S 8

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.

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

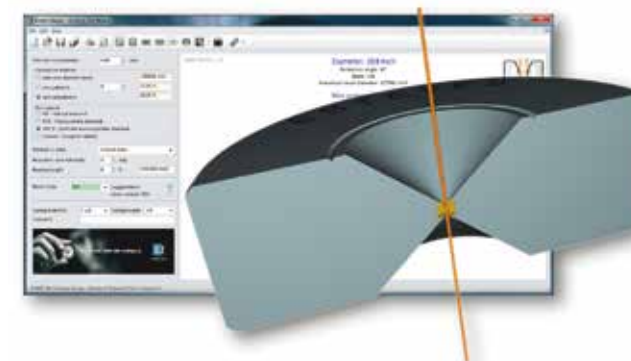


Inventory stocking and die shop services

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.

Industries

	Drawing dies	Matched elongation sets	Recuts	Shape profile dies	Bunching, stranding & compacting dies	Diamond coated (DC) dies	Extrusion tools	Miscellaneous & specialty tooling
Energy sector								
Aluminum-clad steel wire (ACS)	●		●	●	●	●	●	
Building wire	●	●	●	●	●	●	●	
Copper-clad aluminum wire (CCA)	●	●	●	●	●	●	●	
Copper-clad steel wire (CCS)	●	●	●	●	●	●	●	
High & Extra high voltage cable	●	●	●	●	●	●	●	
Medium & Low voltage cable	●	●	●	●	●	●	●	
Overhead conductor cable	●	●	●	●	●	●	●	
Saw wire	●		●	●	●	●	●	
Steel rope	●		●	●	●	●	●	
Submarine cable	●		●	●	●	●	●	
Trolley wire	●		●	●	●	●	●	
Automotive industry								
Battery cable	●	●	●	●	●	●	●	
Catalytic converters (platinum wire)	●	●	●	●	●	●	●	
Enameled wire	●	●	●	●	●	●	●	●
Spring wire	●		●	●	●	●	●	
Tire cord & Bead wire	●		●	●	●	●	●	
Welding wire	●		●	●	●	●	●	
Wire harness	●	●	●	●	●	●	●	
Electronic industry								
Bonding wire	●	●	●	●	●	●	●	
Enameled wire	●	●	●	●	●	●	●	●
Spring wire	●		●	●	●	●	●	
Precision wires								
Shape wire for industry applications	●	●	●	●	●	●	●	
Superconducting	●	●	●	●	●	●	●	
Watch industry	●	●	●	●	●	●	●	
Aerospace and defense industry								
Copper plated wire	●	●	●	●	●	●	●	
Enameled wire	●	●	●	●	●	●	●	●
Medical sector								
Medical tubing	●	●	●	●	●	●	●	●
Memory wire	●	●	●	●	●	●	●	●
Special alloys	●	●	●	●	●	●	●	●
Stainless steel alloys	●	●	●	●	●	●	●	●
Superconducting	●	●	●	●	●	●	●	●
Titanium wire	●	●	●	●	●	●	●	●
Welding industry								
MIG	●	●	●	●	●	●	●	
Special alloys	●	●	●	●	●	●	●	
Submerged arc welding wire	●	●	●	●	●	●	●	
TIG	●	●	●	●	●	●	●	
Welding electrodes	●	●	●	●	●	●	●	
Building and construction								
Building wire and cable	●	●	●	●	●	●	●	
Concrete reinforcement wire	●	●	●	●	●	●	●	
Low voltage cable	●	●	●	●	●	●	●	
Communication & data transmission								
Coaxial & micro coaxial cable	●	●	●	●	●	●	●	
Fiber optics	●	●	●	●	●	●	●	●
LAN cable	●	●	●	●	●	●	●	
Telephone cable	●	●	●	●	●	●	●	
Other industrial sectors								
Ball bearing wire	●	●	●	●	●	●	●	
Brush & rope wire	●	●	●	●	●	●	●	
Carbon steel & stainless steel for fasteners	●	●	●	●	●	●	●	
Chain wire	●	●	●	●	●	●	●	
Copper tube	●	●	●	●	●	●	●	●
EDM wire	●	●	●	●	●	●	●	●
Fence wire	●	●	●	●	●	●	●	
Hose reinforcement wire	●	●	●	●	●	●	●	
Stainless steel tube	●	●	●	●	●	●	●	●
Wire mesh	●	●	●	●	●	●	●	●



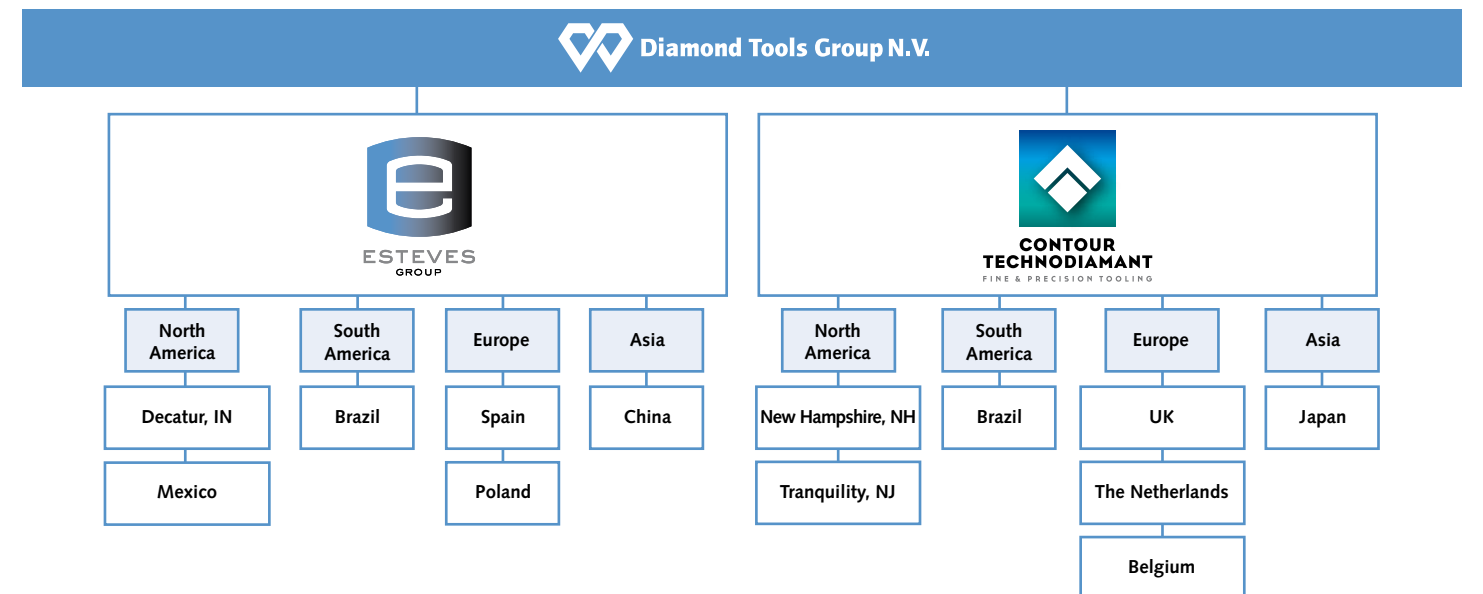
Why Esteves Group

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.

About Esteves Group

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.

Esteves Group develops and manufactures tooling with exceptional performance and outstanding quality for the wire and cable industry.



Visit www.estevesgroup.com to find detailed information about all products and services that Esteves Group offers

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