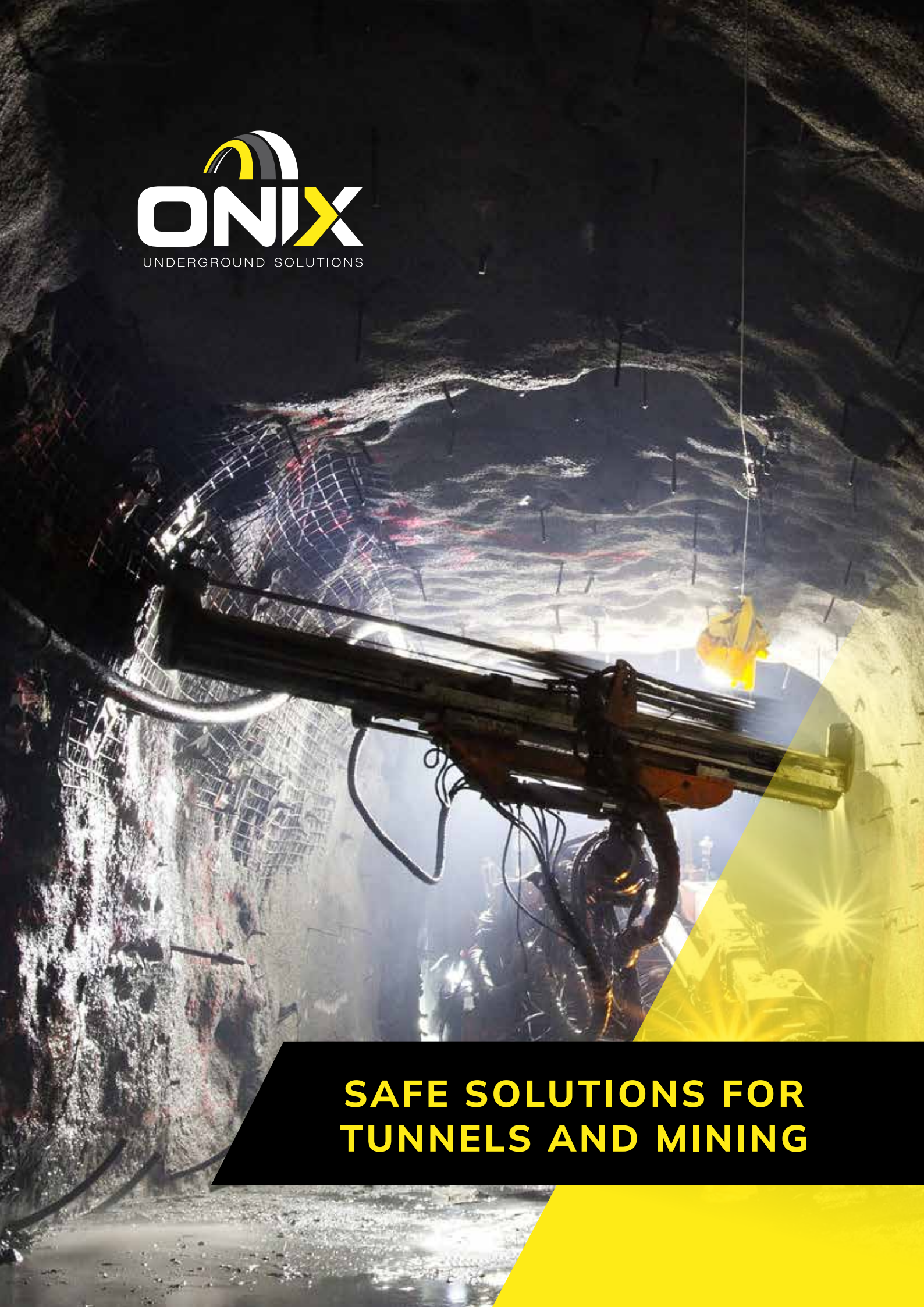

ONIX
UNDERGROUND SOLUTIONS
SAFE SOLUTIONS FOR
TUNNELS AND MINING

An underground project implies a challenge for engineering, but also for the safety of people and technical equipment

*At Onix Underground, we provide **safe and efficient support solutions** so that underground mining and tunnel infrastructure companies **can operate with peace of mind**. For us, **safety is the top priority***

ABOUT US

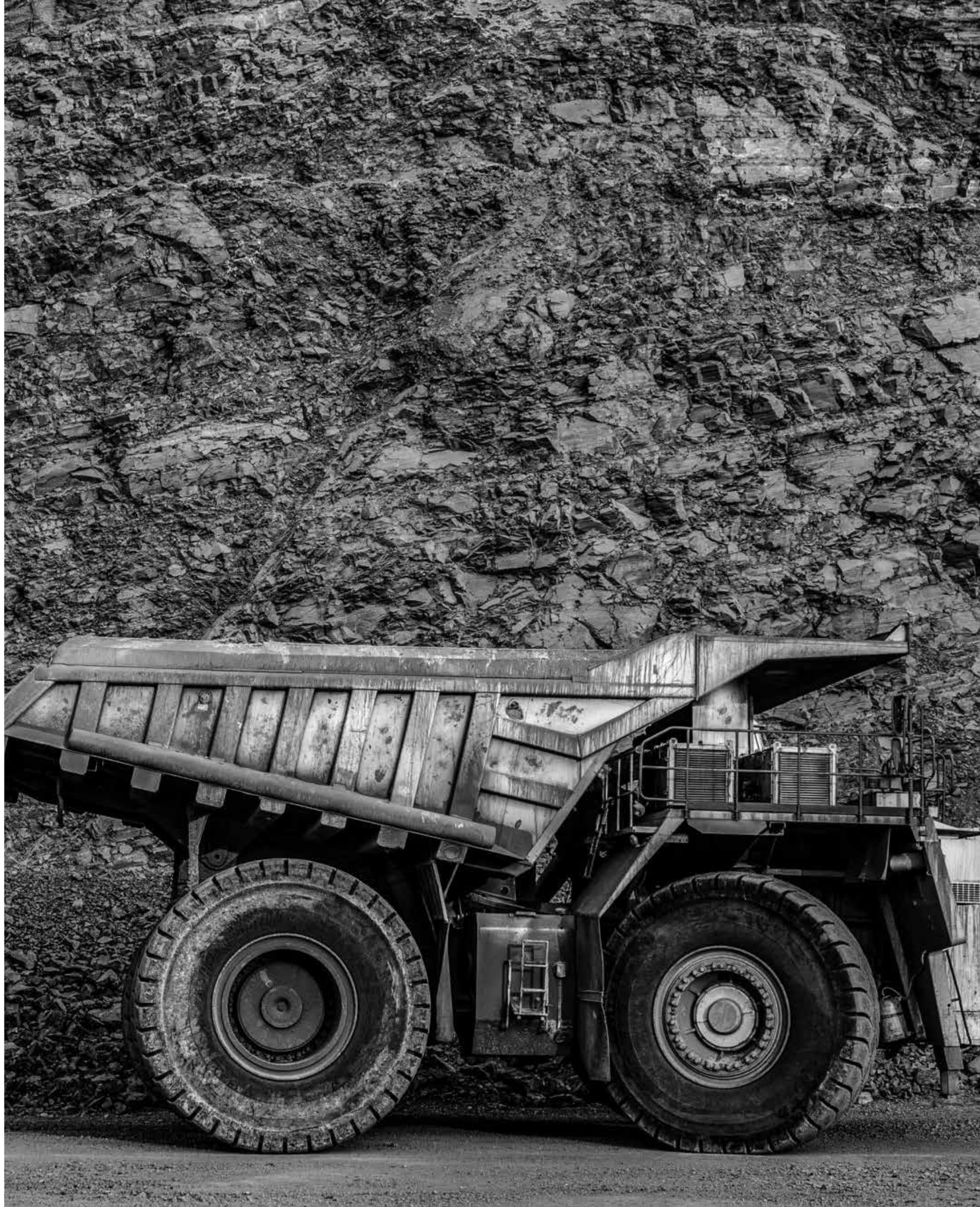
We welcome you to Onix Underground, where safety is our top priority. We are leaders in the design, manufacturing, and marketing of underground support solutions for mining and tunnel infrastructure. Onix mining products enhance the safety of personnel and equipment working underground.

At Onix Underground, we foster innovation in the industry. We understand that safety and efficiency are paramount.

That is why each product in our brochure incorporates the latest technologies to ensure optimal performance, reliability, and durability even under extreme conditions. Our commitment to safety permeates every aspect of our business; from expandable rock bolts and split-set or self-drilling anchors, to steel arches and mesh, to quality testing, verification of support systems, underground mining consultancy, technical training, and microtunneling.

Every product and service in our brochure is designed to meet the highest security standards and provide our clients with utmost peace of mind for their projects.

We invite you to explore our brochure and discover how we can assist you in conducting underground operations safely and efficiently. Working with Onix Underground, you can trust in a partner dedicated to your safety and profitability.



PRODUCTS AND SERVICES

UNDERGROUND SUPPORT

“We are proud to make underground mines and tunnels more efficient and safer for workers”

BOLTS

CONTENT

EMC EXPANDABLE ROCK BOLTS

These are bolts consisting of a tube made of high-yield steel, bent into an omega shape and sealed at the ends with bushings.

Once inserted into the rock borehole, which must have a diameter smaller than the original diameter of the tube, they are expanded by applying water pressure. This expansion puts them into load-bearing position, providing immediate support. This is achieved through the action of two types of forces: radial pressure perpendicular to its axis along its entire length and frictional force along its entire length.

All bolts are marked to ensure traceability at all times.

ADVANTAJES OF ITS USE

- Immediate reinforcement of the rock mass
- Wide range of application
- Does not require adhesive elements
- Excellent performance against vibrations
- High resistance to shear stresses
- Great installation time efficiency compared to other types of bolts

FIELDS OF APPLICATION

- Underground mining
- Tunnel construction
- Slope and geotechnical structures stabilization

TECHNICAL PROPERTIES

SPECIFICATIONS	STANDARD	MIDI	SUPER
Variable Lenght Up To	6m	6m	6m
Tube Thickness	2mm	2mm	3mm
Original Pipe Diameter	41mm	54mm	54mm
Maximum Pipe Diameter	26 mm	39 mm	39 mm
Recomm Drill Diameter	36-38 mm	45-51 mm	45-51mm
Minimum Breaking Load	120 kN	160kN	240kN
Weight	2 kg/m	2,7 Kg/m	3,9 kg/m
Raw Material Quality	S 355-MC	S 355-MC	S 355-MC
Yield Strenght	100 kN	120 kN	220 kN
Maximum Elogation	10-20%	10-20%	10-20%
Inflation Pressure	300bar	240bar	300bar
Front Bushing Diameter	28mm	38mm	38mm
Diameter of the Inflation Bushing	30mm	41mm	41mm
Recommended Plate	150x150x4	200x200x5	200x200x6

* Regarding the packaging, the bolts are strapped with single-use straps in bundles of 50 and 100 bolts to make the unloading easier.

EMC EXPANDABLE ROCK BOLTS – AUTODEPOSITION TREATMENT

They have the same characteristics as our EMC expandable rock bolts, but they are recommended for projects where we the terrain has highly corrosive agents.

The EMC expandable rock bolts with anticorrosive treatment have a coating that provides high resistance to corrosion, hardness, and durability, yet with the necessary elasticity to allow the bolt to expand.

ADVANTAJES OF ITS USE

- Immediate reinforcement of the rock mass
- Wide range of application
- Does not require adhesive elements
- Excellent performance against vibrations
- High resistance to shear stresses
- Great installation time efficiency compared to other types of bolts
- Increases the lifespan of the support
- Converts a temporary support into a permanent one
- Prevents possible deterioration of the bolt over time and during storage

FIELDS OF APPLICATION

- Terrains with highly corrosive agents
- To increase the lifespan of the support element
- To convert temporary support into permanent
- To prevent potential deterioration of the bolt over time and during storage

TECHNICAL PROPERTIES

SPECIFICATIONS	STANDARD	MIDI	SUPER
Variable Lenght Up To	6m	6m	6m
Tube Thickness	2mm	2mm	3mm
Original Pipe Diameter	41mm	54mm	54mm
Maximum Pipe Diameter	26 mm	39 mm	39 mm
Recomm Drill Diameter	36-38 mm	45-51 mm	45-51mm
Minimum Breaking Load	120 kN	160kN	240kN
Weight	2 kg/m	2,7 Kg/m	3,9 kg/m
Raw Material Quality	S 355-MC	S 355-MC	S 355-MC
Yield Strenght	100 kN	120 kN	220 kN
Maximum Elogation	10-20%	10-20%	10-20%
Inflation Pressure	300bar	240bar	300bar
Front Bushing Diameter	28mm	38mm	38mm
Diameter of the Inflation Bushing	30mm	41mm	41mm
Recommended Plate	150x150x4	150x150x5	150x150x6

* Regarding the packaging, the bolts are strapped with single-use straps in bundles of 50 and 100 bolts to make the unloading easier.

SELF-DRILLING ANCHORS

It’s an ideal solution for unstable terrain conditions such as sands, silts, and clays, as well as fractured rock formations. In these terrain conditions, Self-Drilling Anchors are the most efficient solution.

At Onix Underground, we offer a wide range of Self-Drilling Anchors to adapt to the needs of your project. Additionally, there’s the possibility of customizing the bolts with the client’s information.

ADVANTAJES OF ITS USE

- It’s drilled and installed in a single operation
- Consolidation of unstable or loosely-consolidated terrains thanks to injection
- Lengths of over 15m can be achieved with couplings
- Rapid stabilization and high load-bearing capacity

FIELDS OF APPLICATION

- Rock support
- Anchoring systems
- Soil and gallery fortification

COMPONENTS

Threaded bar

- They are manufactured from cold rolled API steel tubes to a standard ISO rope thread profile
- The rolling process increases the yield strength and produces a durable drilling rod suitable for a wide range of applications
- They are hollow bars for the subsequent injection of grout or resin
- Lengths of 2, 3, 4, and 6 meters

Extension/connection coupling(s)

- To join bars of different sizes and achieve a major length
- They must have an equal or superior strength of the bars that they are joining
- To allow the proper settling of each bar within the coupling, all ONIX bars are precisely chamfered to allow the bar ends to make face-to-face contact.

Single-use drill bit

- It drills as the SDA advances.
- Different types depending on the terrain where they will be used:
  - EX: Hardened cross bit for loose to moderately dense formations
  - ES: Hardened button bit for unconsolidated rock with rounded edges
  - EXX: TC cross bit for soft to medium rock formations
  - ESS: TC button bit for medium rock formations

Hexagonal nuts

- Hexagonal or spherical nuts made of high-quality steel to meet the requirements of the SDA.
- All our nuts surpass the breaking load limit of the SDA.

TECHNICAL PROPERTIES

SPECIFICATIONS	UNI	R25	R32N	R32N	R32S	R32SS	R38N	R51N	T30N	T40N	T53	T76N
Outer Diameter	mm	25	32	32	32	32	38	51	30	40	52	76
Inner Diameter	mm	12.0	21.5	20.0	17.0	15.0	22.0	34.0	11.0	16.0	26.0	51.0
Area	mm2	300	304	365	440	520	610	892	420	790	1250	1990
Tensile Load	kN	200	210	280	360	400	500	800	320	660	930	1600
Yield Load	kN	150	160	230	280	330	400	630	260	525	730	1200
Tensile Strenght	Mpa	870	690	770	820	770	960	897	785	835	750	800
Yield Strenght	Mpa	650	526	630	640	630	770	706	665	665	580	600
Nominal Weight	Kg/m	1,8	2.6	2.9	3.4	4.1	4.0	7.0	3.2	6.2	9.9	15.6

ESPECIFICACI	UNI	R25	R32L	R32N	R32S	R32SS	R38N	R51L	T30N	T40N	T52	T76N
Diameter	mm	35	42	42	42	42	52	63	38	54	70	95
Length	mm	120	145	160	190	190	220	140	105	140	160	200
Weight	Kg	0.45	0.77	0.8	0.95	0.95	1.85	1.30	0.45	1.2	2.3	4.3

Machined steel connector with a stop in the middle. Normally supplied with anti-rust oil. It is also possible to supply with painted or galvanized surface treatmen

THREAD	BITS DIAMETER (mm)
R25	ø 42, ø 51
R32	ø 51, ø 76, ø 90
R38	ø 76, ø 90, ø 100, ø 110, ø 115, ø 130
R51	ø 76, ø 90, ø 100, ø 110, ø 115, ø 130, ø 150
T30	ø 41, ø 51, ø 76, ø 90
T40	ø 76, ø 90, ø 110, ø 115
T52	ø 76, ø 90, ø 110, ø 115, ø 130, ø 150
T76	ø 130, ø 150, ø 160, ø 180, ø 200

ESPECIFIC	UNI	R25	R32L	R32N	R32S	R32SS	R38N	R51L	T30N	T40N	T52	T76N
Diámetro	mm	41	46	46	46	46	50	75	46	65	80	100
Longitud	mm	35	45	45	45	45	55	70	35	50	70	80
Peso	Kg	0.25	0.35	0.35	0.55	0.55	0.5	1.55	0.36	0.85	2.35	2.70

Forged or machined steel nut. Normally supplied with anti-rust oil. It is also possible to supply with painted or galvanized surface treatment

R-TYPE SELF-DRILLING ANCHOR

R-TYPE

Self-drilling R-type anchors feature excellent internal and external quality control.

The R-thread complies with ISO10208, ISO 1820 (R51), and the hollow interior of the bars ensures compliance with EN14199/EN14490/ASTMF432/ASTM A615 standards.

Special lengths manufacturing is available upon request, as well as galvanized or combined coating components.

TECHNICAL PROPERTIES

SPECIFICATIONS	UNIT	R25	R32N	R32N	R32S	R32SS	R38N	R51L	R51N
Outer Diameter	mm	25	32	32	32	32	38	51	51
Inner Diameter	mm	12.0	21.5	20.0	17.0	15.0	22.0	36.0	34.0
Area	mm2	300	304	365	440	520	610	700	892
Tensile Load	kN	200	210	280	360	400	500	550	800
Yield Load	kN	150	160	230	280	330	400	450	630
Tensile Strength	Mpa	870	690	770	820	770	960	790	897
Yield Strength	Mpa	650	526	630	640	630	770	640	706
Nominal Weight	Kg/m	1,8	2.6	2.9	3.4	4.1	4.0	5.6	7.0
Rm/Rp0.2		>1.15	>1.15	>1.15	>1.15	>1.15	>1.15	>1.15	>1.15
Agt.	%	>5	>5	>5	>5	>5	>5	>5	>5
Steel Grade					EN10210-1				

PERNO AUTOPERFORANTE TIPO T

T-TYPE

Self-drilling T-type anchors feature excellent internal quality control.

The T-thread has a longer pitch and a greater profile angle, all in accordance with manufacturing standards.

The hollow interior of the bars ensures compliance with EN14199/EN14490/ASTMF432/ASTM A615 standards.

TECHNICAL PROPERTIES

ESPECIFIC.	UNI.	T30	T40L	T40N	T52	T73	T76L	T76N	T76S	T103
Outer Diameter	mm	30	40	40	52	73	76	76	76	103
Inner Diameter	mm	11.0	20.0	16.0	26.0	35.0	58.0	51.0	44.0	51
Area	mm2	408	636	790	1250	2395	1610	1990	2400	5100
Tensile Load	kN	320	540	660	930	1865	1200	1600	1900	3490
Yield Load	kN	260	430	525	730	1435	1000	1200	1500	2660
Tensile Strength	Mpa	785	849	835	750	780	750	800	790	680
Yield Strength	Mpa	635	676	665	580	600	620	600	620	520
Nominal Weight	Kg/m	3.2	5.0	6.2	9.9	18.8	12.6	15.6	17.0	40.0
Rm/Rp0.2		>1.15	>1.15	>1.15	>1.15	>1.15	>1.15	>1.15	>1.15	>1.15
Agt.	%	>5	>5	>5	>5	>5	>5	>5	>5	>5
Steel Grade					EN10210-1					

SPLIT SET

It is an easily installation fortification system that works by friction and offers immediate support. It consists of a longitudinally grooved tube, with one end tapered for easy insertion into the borehole.

The bolt is inserted into a hole with a diameter smaller than its outer diameter by impacting the bolt.

When the bolt is inserted into a smaller hole, forces are generated against the walls of the borehole, creating frictional resistance along the entire length of the bolt.

ADVANTAJES OF ITS USE

- Immediate load capacity
- Easy and quick installation
- High adaptability to the terrain

FIELDS OF APPLICATION

- Underground mining
- Tunnel construction
- Infrastructure operation

TECHNICAL PROPERTIES

ESPECIFICACIONES	UNI.	D33	D39	D42	D47
Variable Lengths Up To	m	3	3	3	3
Tube Thickness	mm	2	2.3	2.5	3
Raw Material Quality	(o equivalente)	S355JR	S355JR	S355JR	S355JR
Outer Diameter	mm	33	39	42	47
Recommended Drill Diameter	mm	30-32	35-38	38-40	43-45.5
Weight	Kg/m	1.5	1.8	2.2	2.9
Minimum Elastic Limit	kN	80	90	100	120
Minimum Breaking Load	kN	100	120	132	165
Elongation	%	>20	>20	>20	>20
Recommended Plate		150x150x4	150x150x4	150x150x4.5	150x150x5

Available in black steel, hot-dip galvanized, or electro-galvanized.

REBAR BOLTS

It is a corrugated steel bar for concrete reinforcement, with one end threaded to a length of 150-200 mm to install a nut with an anchoring plate, and the other end cut at a 45-degree angle for insertion into the hole. It consists of a main body with a series of longitudinal grooves (corrugations) that increase its anchoring capacity in the surrounding rock.

The 45-degree cut inner end facilitates its insertion, and the threaded outer end tensions the bolt and the plate using a nut, which can be hexagonal or round.

They can be installed with resin cartridges or cement mortar.

ADVANTAJES OF ITS USE

- They can be manufactured in very long lengths to reach firmer areas.
- High load capacity.
- Provides strong adherence with concrete or grout.

FIELDS OF APPLICATION

- Rock support and stabilization
- Underground mining and tunnel reinforcement
- Slope stabilization and structural anchoring

TECHNICAL PROPERTIES

SPECIFICATIONS	D-16	D-20	D-25	D-32
Variable Lengths Up To	12m	12m	12m	12m
Nominal Diameter	16mm	20mm	25mm	32mm
Thread	M16	M20	M26	M30
Nominal Section	249mm2	315mm2	490mm2	615mm2
Weight	1,58 kg/m	2,47 kg/m	3,58 kg/m	6,31 kg/m
Yield Load	139 kN	173 kN	245 kN	308 kN
Breaking Load	150 kN	190 kN	260 kN	330 kN
Maximum Elongation	5%	5%	5%	5%
SW Nut	6	8	10	12
Recommended Plate	100x100x8	100x100x8	100x100x10	100x100x12

CT BOLTS

It consists of a corrugated bar with a head at one end and an anchoring device at the other. The anchoring device consists of a plate and a bulb that expands when tension is applied to the bar, anchoring the bolt to the surrounding rock.

It is a unique and advantageous solution that combines a mechanical anchor with grout or resin injection, thus offering both systems in one.

The installation is carried out in two phases: first, the mechanical anchoring, and then the grout, with both being independent.

ADVANTAJES OF ITS USE

- Permanent anchoring system and active reinforcement through pre-stressing of the expansion anchor
- High resistance to seismic movements and explosions
- Excellent performance in highly corrosive terrains

FIELDS OF APPLICATION

- Underground mining and tunnel construction
- Dam and bridge construction
- Projects with high seismic activity

TECHNICAL PROPERTIES

SPEFICITATIONS	CT- M20	CT - M24	CT - M33
Variable Lengths Up To (mm)	8000	8000	12000
Rule	EN 1090-1:2009	EN 1090-1:2009	EN 1090-1:2009
Raw Material Quality	B500 NC	B500 NC	B500 NC
Rebar Diameter (mm)	20	24	33
Thread	M20	M24	M33
Min Elongation	5%	5%	5%
Min Elastic Limit (kN)	123	177	347
Min Breaking Load (kN)	147	212	416
Min Elastic Limit with Grount (kN)	157	246	402
Min Breaking Load with Grount (kN)	188	295	482
Recommended Drill Diameter (kN)	45-48	45-52	64-70
Recommended Drill Length (kN)	+200mm L bolt	+200mm L bolt	+200mm L pernbolto
Recommended Plate	150x150 #5 (Dommed)	150x150 #5 (Dommed)	210x210 #10 (Dommed)
Weight	2,9	4,7	7,72
Expansion Shell	D45-50	D45-50	D64-70

GFRP BOLTS

GFRP bolts are glass fiber-reinforced bolts used as an alternative to steel support elements.

They can be installed in combination with concrete, mortar, or resin depending on the application.

ADVANTAJES OF ITS USE

- Easy handling due to their lightweight nature
- High tensile load capacity
- High durability
- Easy to cut to obtain other measurements
- Corrosion-resistant

TYPES

- Solid bar bolts
- Hollow bar bolts
- Self-drilling bolts
- Reinforcement bars
- Composite mesh

TECHNICAL PROPERTIES

SPECIFICATIONS	S20	S25	S32	H25	H32	SD32
Type	Solid bar	Solid bar	Solid bar	Hollow bar	Hollow bar	SDA
Vari. Lengths Up To (m)	6	6	6	6	6	6
Out. Nominal Diameter (mm)	20	25	32	25	32	32
Breaking Load (kN)	190	300	560	250	350	315
Nominal Section (mm2)	185	345	580	230	340	340
Maximum Elongation (%)	2.5	1.7	2.5	2.5	2.5	1.5
Weight x Meter (kg)	0.60	0.90	1.30	0.65	1.00	0.95

CABLE BOLTS

We offer a range of cable bolts manufactured from grade 1860MPa steel wires, including plain and bulbed varieties.

These cable bolts provide superior tensile strength, anti-shearing capacity, and bending resilience, effectively preventing lateral strata movement.

With a commitment to quality, safety and innovation, Onix delivers reliable ground support solutions to meet the demands of modern infrastructure and mining projects.

ADVANTAJES OF ITS USE

- The bulbed cable bolt features three bulbs at the top to reinforce the resin mixture, achieve anchoring, and pre-tension
- Bulbs can be customized in frequency and diameter according to customer specifications, with diameters ranging from 21mm to 38mm
- We offer plain or bulbed options, with bulb spacings of 0.5m or 1m
- Available in single or double-threaded options
- Hooks placed at the top of the cables for retention before grouting
- Resin can be applied for immediate point anchoring and grout for permanent Support

FIELDS OF APPLICATION

- Mines
- Tunnels
- Slopes
- Places where need ground Support

TECHNICAL PROPERTIES

SPECIFICATIONS	TRCB152	TRCB178	TRCB189	TRCB216	TRCB218
Diameter (mm)	15.2	17.8	18.9	21.6	21.8
Strands	1*7	1*7	1*7	1*7	1*19
Mass per meter (kg)	1.1	1.5	1.73	2.24	2.48
Cross sectional área (mm2)	140	191	220	285	313
Steel Grade (Mpa)	1860	1860	1860	1860	1860
Tensile strength (kN)	260 (26.5T)	355 (36.2T)	409 (41.7T)	530 (54.1T)	583 (59.5T)
Min.0.2% extension under load (kN)	229	311	360	466	513
Min. Elongation (%)	3.5	3.5	3.5	3.5	3.5

PLATES

Plates are fastening accessories designed to support the anchoring bolt against the rock or other elements such as mesh.

The plate must control and distribute deformation by generating a confinement action, as the bolt is subjected to tension and therefore acts as a support element for rock deformation.

Distribution plates may have galvanized coating to offer greater durability in environments that cause steel corrosion. Commonly used in support bolts, ONIX offers a wide variety of distribution plates.

We have the manufacturing capacity to produce any type of plate according to the specific needs of each client.
Distribution plates can have round or slotted holes.
Material grades available in S275JR and S355JR. Other grades available upon request.

ADVANTAJES OF ITS USE

- Provide uniform support for the bolt.
- Hold other elements such as mesh.
- Control ground deformation.
- Facilitate bolt installation when they are not aligned perpendicular to the ground.

FIELDS OF APPLICATION

- Rock support
- Anchoring systems
- Rock repair
- Equipment installation

TECHNICAL PROPERTIES

SPECIFICATIONS	150X150X4	150X150X5 150X150X6	200X200X5 200X200X6	FLAT PLATE	DOBLE D PLATE
Length A	150 mm	150 mm	200 mm	100/150/200/300 mm	150/200/300 mm
Width B	150 mm	150 mm	200 mm	100/150/200/300 mm	150/200/300 mm
Thickness e	4 mm	5 : 6 mm	5 : 6 mm	6/8/10/12 mm	12 mm
Diameter D	30/42 mm	30 mm	40/50 mm	s/bolt	2x ø20
Dommed height H	24.5 mm	25 mm	25 mm	0 mm	0 mm
Bolts types	EMC 120kN	EMC 160 kN	EMC 240 kN	Rebar Bolt	Cable Bolt
Bolts types	Split set ø39	EMC 240 kN	Split set ø47	SDA	Cable Bolt

RESIN CARTRIDGES

Onix resin capsules are two-component resin mortars: firstly, a putty based on polyester resin and, secondly, a hardener containing organic peroxide.

The two components are separated from each other by a plastic sleeve. The application parameters of the capsules (sizes and reaction times) can be adjusted to the specific needs of the client.

ADVANTAJES OF ITS USE

- Reliability - Our cartridges have been successfully applied around the world for decades
- The bond strength is greater than the anchor strength
- Our rigid resin cartridges slide easily into the piercing
- Capsules are available in various dimensions, reaction times and viscosity parameters
- Quick installation process

FIELDS OF APPLICATION

- Anchoring rock bolts, anchors and “Soil Nailing” for soil improvement
- Anchor bolts for machinery
- Pipe and cable support fixings
- Accessories for building structures

TECHNICAL PROPERTIES

SPECIFICATIONS	UNIT	LOKSET TYPE	
		HS	ST, HSF1, APAGADO
Compressive strength (24h)	Mpa	≥80	≥60 (gel time> 60 seg) ≥30 (gel time < 60 seg)
Cut resistance	Mpa	≥25	-
Modulus of elasticity	GPa	≥11	-
Creep	%	≤0,12	≥20

STEEL ARCHES

CONTENT

THN STEEL ARCH SUPPORT

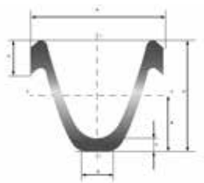
The THN support arch is an element used in underground mining and tunnelling operations to support the walls of excavations and prevent collapse. It consists of a steel arch formed by an Omega-shaped profile (grade 31Mn4 according to DIN21544 and >350N/mm2), which can be curved in the opposite direction, overlapping with each other through connecting clips to form the complete arch. This structure distributes the load of the rock and keeps it in place, thus protecting workers and machinery in the mine.

THN support arches are also known as sliding arches, and this is one of their main characteristics. Thanks to their overlap, these arches can be stretched or contracted during installation to adapt to the excavated section. Once installed, the clips, depending on the type, have a certain degree of sliding that absorbs the section's efforts when moving, helping to absorb loads before the arch fatigue occurs.

ADVANTAJES OF ITS USE

- Easily adapt to the terrain section thanks to their overlap and sliding
- Combine the strength of steel with the arch's sliding under the pressure of the terrain to prevent exhaustion
- Very simple and fast assembly
- They can be reused
- Excellent support-to-weight ratio thanks to their large cross-sectional moment of inertia relative to weight per meter

FIELDS OF APPLICATION



- Construction of mining galleries
- Civil engineering projects
- Construction of tunnels
- In areas with unstable rock or weak soil

TECHNICAL PROPERTIES

SPECIFICATIONS	THN 16.5	THN 21	THN 29	THN 36
Weight (Kg/m)	16.5	21	29	36
Profile Height (mm)	90	108	124	138
Profile W idth (mm)	106	124	151	171
Neutral Axis (mm)	48	52	58	69
Section Module (wx)	47	61	90	136
(*) >350 N/MM2				

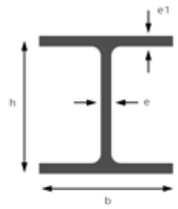
HEB STEEL ARCHES

They are support arches manufactured from curved HEB structural profile segments that are joined together with bolted connection plates. Due to their high strength, they are used to maintain the section with minimal deformation or where the section must be strictly limited, as is the case in civil engineering tunnels.

ADVANTAJES OF ITS USE

- They easily adapt to the terrain section thanks to their design
- High strength as they can use profiles with large moment of inertia
- Very simple and quick assembly using screws and joining plates
- It can be concreted after installation, making it a permanent structure and reinforcing the concrete

FIELDS OF APPLICATION



- Hydroelectric power plants
- Civil engineering projects
- In areas prone to collapse
- Railway projects
- Construction of tunnels

TECHNICAL PROPERTIES

SPECIFICATIONS	HEB100	HEB120	HEB140	HEB160	HEB180	HEB200
Weight (Kg/m)	20,4	26,7	33,7	42,6	51,2	61,3
Standard	EN 10025	EN 10025	EN 10025	EN 10025	EN 10025	EN 10025
DRAWING DIMENSIONS						
H-section (mm)	100	120	140	160	180	200
B-section (mm)	100	120	140	160	180	200
E-section (mm)	6	6,5	7	8	8,5	9
E1-section (mm)	10	11	12	13	14	15
QUALITY S275JR						
Modulus (N/mm)	275	275	275	275	275	275
QUALITY S355JR						
Modulus (N/mm)	355	355	355	355	355	355

PIPE UMBRELLA SYSTEM

A Pipe Umbrella System consists of metal tubes placed on top of the micropile during its installation. The installed tubes expand into the surrounding soil, providing stability and preventing the hole from collapsing during excavation. Additionally, they enhance the load-bearing capacity of the micropile by increasing the surface contact area with the soil, which helps distribute structural loads uniformly.

Rotation and percussion are applied to the crown through the drilling mouth. The shoe to which the the starting tube is welded, is left free. This prevents the pipe from rotating, thus reducing the torque requirements at the rotation head.

The tubes are supplied in custom lengths, with standard or double-entry threads to streamline installation, and with an 8 mm guide entry to facilitate proper alignment during assembly.

ADVANTAGES OF ITS USE

- Adaptability to a variety of soil conditions
- Provides immediate support
- Reinforces the load-bearing capacity of the ground

FIELDS OF APPLICATION

- Underground works
- Excavation protection
- Control of infiltrations in tunnels and galleries
- Tunnel entrances serve as support portals (entrances)

TECHNICAL PROPERTIES

SYSTEM	OUTER DIAMETER (mm)	MAX. THICKNESS (mm)	INT. RING DIAMETER (mm)	OUTER RING DIAMETER (mm)	DRILL BIT (mm)	THREAD	GRADE
ONX76,1/8	73	8	47	90	59	R32	S355 / N80
ONX88,9/8	88,9	8	50,8	94,9	70	C38	S355 / N80
ONX101,6/10	101,6	10	65	110	79	C38	S355 / N80
ONX114,3/10	114,3	10	73,5	120,3	92,5	C38	S355 / N80
ONX139,7/10	139,7	10	94	145,7	117,5	C45	S355 / N80

BERNOLD SHEET

The Bernold Sheets are used as a complement to the use of trusses as primary support. At Onix, we offer Bernold plates for use as lost formwork and reinforcement. This type of sheets can also be used to prevent small detachments within the excavated section.

The stamped and corrugated Bernold sheet has a dimension of 1190×1080×2 mm, and its assembly, taking into account the overlaps between each plate, results in a useful coverage of 1 m².

The presentation of the plates can be straight or curved, depending on the geometry of the truss on which it will be mounted.

ADVANTAJES OF ITS USE

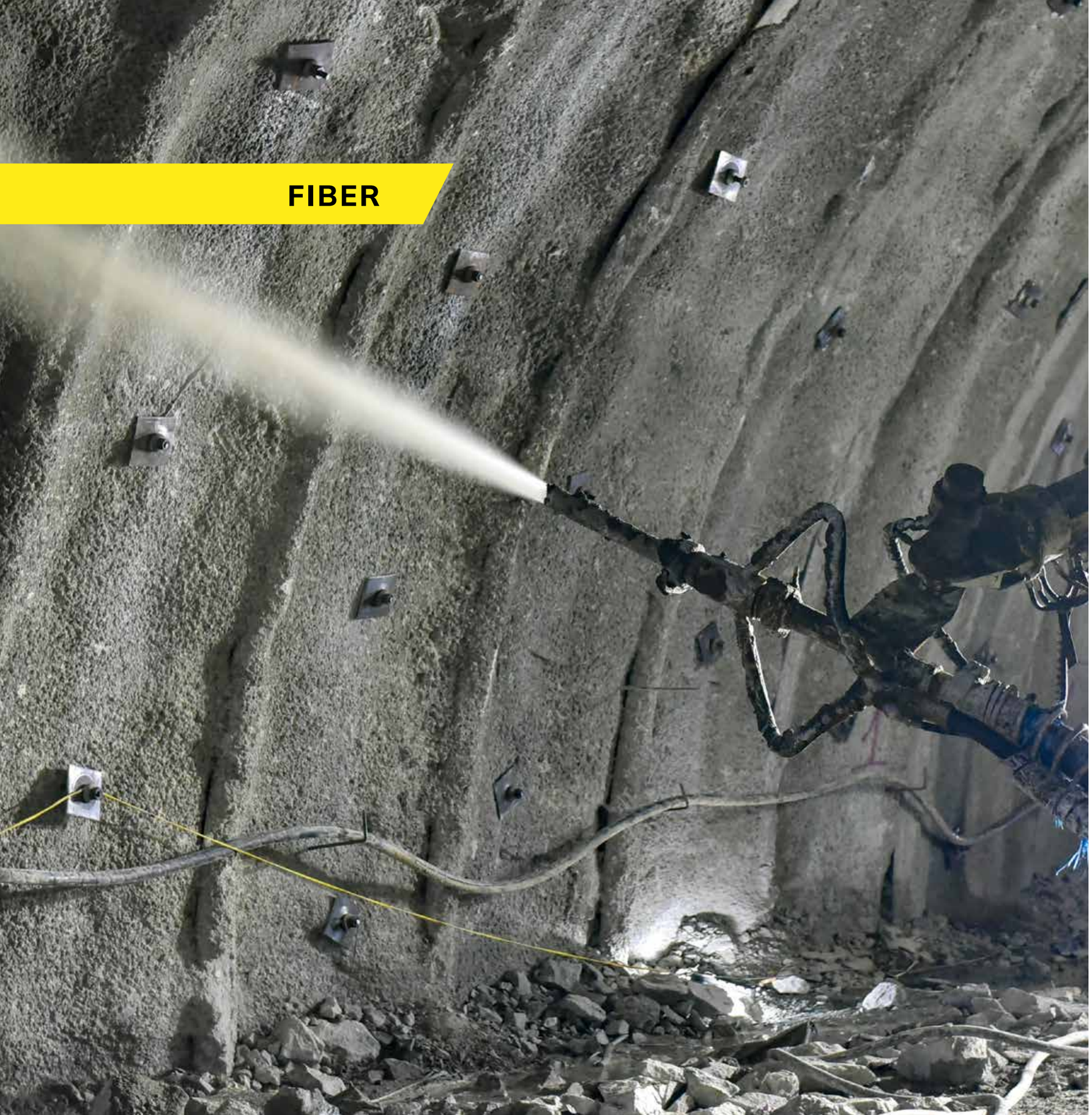
- Allows to support heavy loads
- Resistance to deformation and breakage
- Serve as formwork
- Creation of false tunnels commonly used in portals
- Immediate loading

FIELDS OF APPLICATION

- Tunnels construction
- Water and sewer tunnels
- Construction of mining tunnels to protect workers from mining-related hazards

TECHNICAL PROPERTIES

SPECIFICATIONS	VALUE
Wide	1190 mm
Length Before Rolled	1225 mm
Length After Rolled	1080 mm
Number of Waves	9
Thickness	2 mm +/-2
Weight	21 kg / U



FIBER

CONTENT

STEEL FIBER

They are steel fibers that are mixed with concrete to enhance its physical properties, from its brittleness to its ductility, increasing toughness and resistance to cracking.

When mixed with concrete in the indicated proportion, they enhance the properties of the concrete and therefore the application for which the concrete is intended.

ADVANTAJES OF ITS USE

- Improved reinforcement on uneven terrain with a uniform surface
- Increased tensile, flexural, and shear strength of shotcrete
- Quick application
- Enhanced resistance to concrete cracking, even after cracks occur
- Reduced thickness of shotcrete layer, reducing costs
- Improved physical cohesion of concrete

FIELDS OF APPLICATION

- Construction
- Civil engineering projects
- Underground mining
- Tunnels and sanitation

TECHNICAL PROPERTIES

TYPES	CODE	LENGTH (mm)	DIAMETER (mm)	ASPECT RADIO	APPLICATION
Glued	80/60	60	0.75	80	Floor/Precast
	75/40	40	0.53	75	Shotcrete
	65/60	60	0.90	65	Floor/Precast
	65/35	35	0.54	65	Shotcrete
Loosed	55/30	30	0.55	65	Shotcrete
	65/60	60	0.90	65	Floor/Precast
	35/60	35	0.60	58	Shotcrete
	50/50	50	1.00	50	Floor/Precast
	50/30	30	0.60	50	Shotcrete

POLYPROPYLENE FIBER

It is composed of synthetic polymers such as polypropylene or polyethylene and is presented in the form of long, thin fibers.

The synthetic fiber is used as additional reinforcement in combination with other materials such as concrete, shotcrete, and anchor bolts to reinforce support and improve the stability of underground excavations.

At Onix, we offer a range of high-quality synthetic fibers with high tensile strength (7200 MPa), which provide reinforcement to concrete, increasing flexural strength, enhancing impact resistance, and with the advantage of possessing high corrosion resistance.

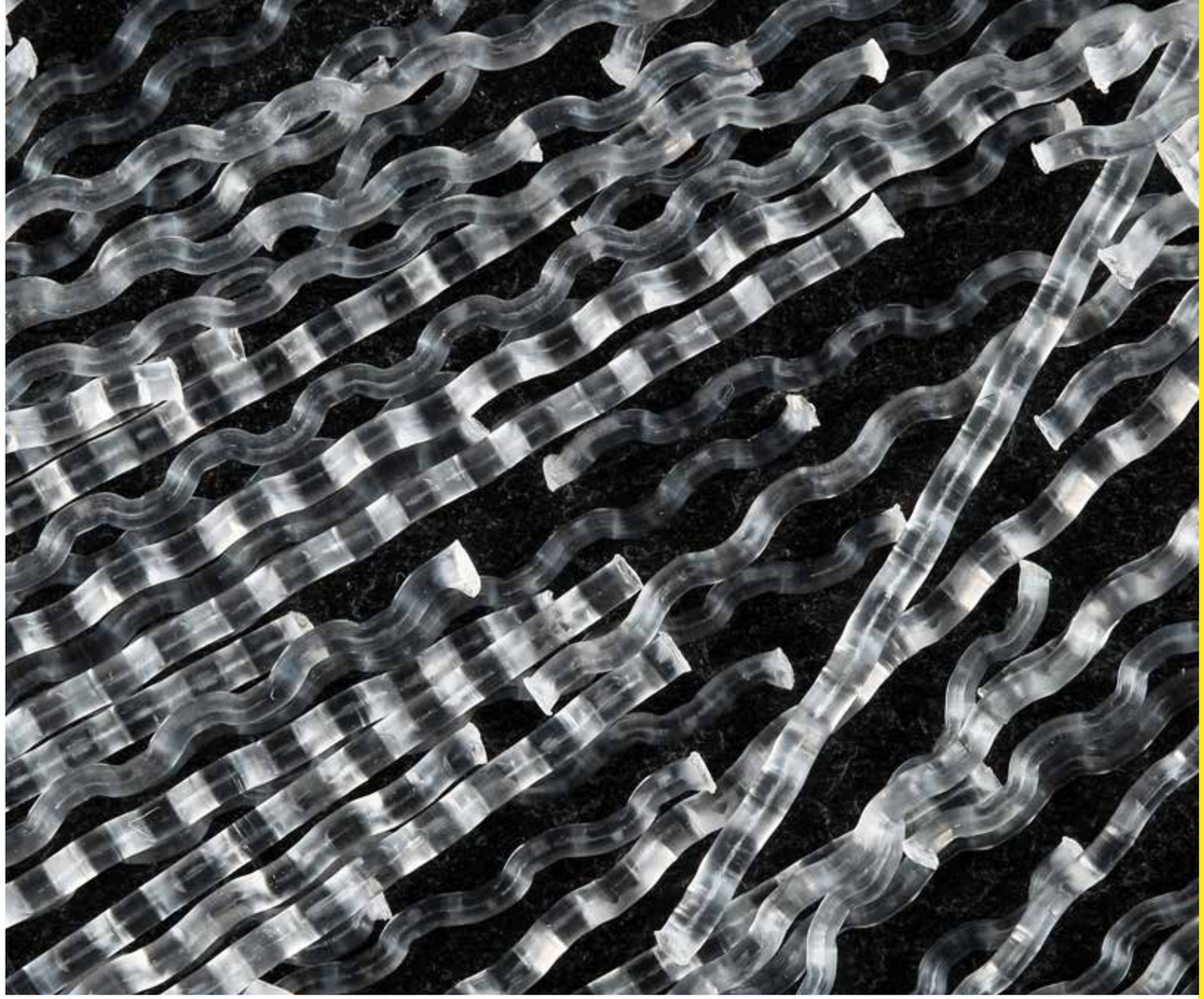
ADVANTAJES OF ITS USE

- It withstands heavy loads
- Lightweight, easier to handle
- Corrosion resistance. Does not rust
- Greater durability. Better fatigue resistance
- Flexibility. Adapts better to changes

Packaged in paper bags of 3 kg and 432 kg per pallet.
They can be safely stacked up to 3 pallets high.
Also available in disc packaging for automatic dosing.

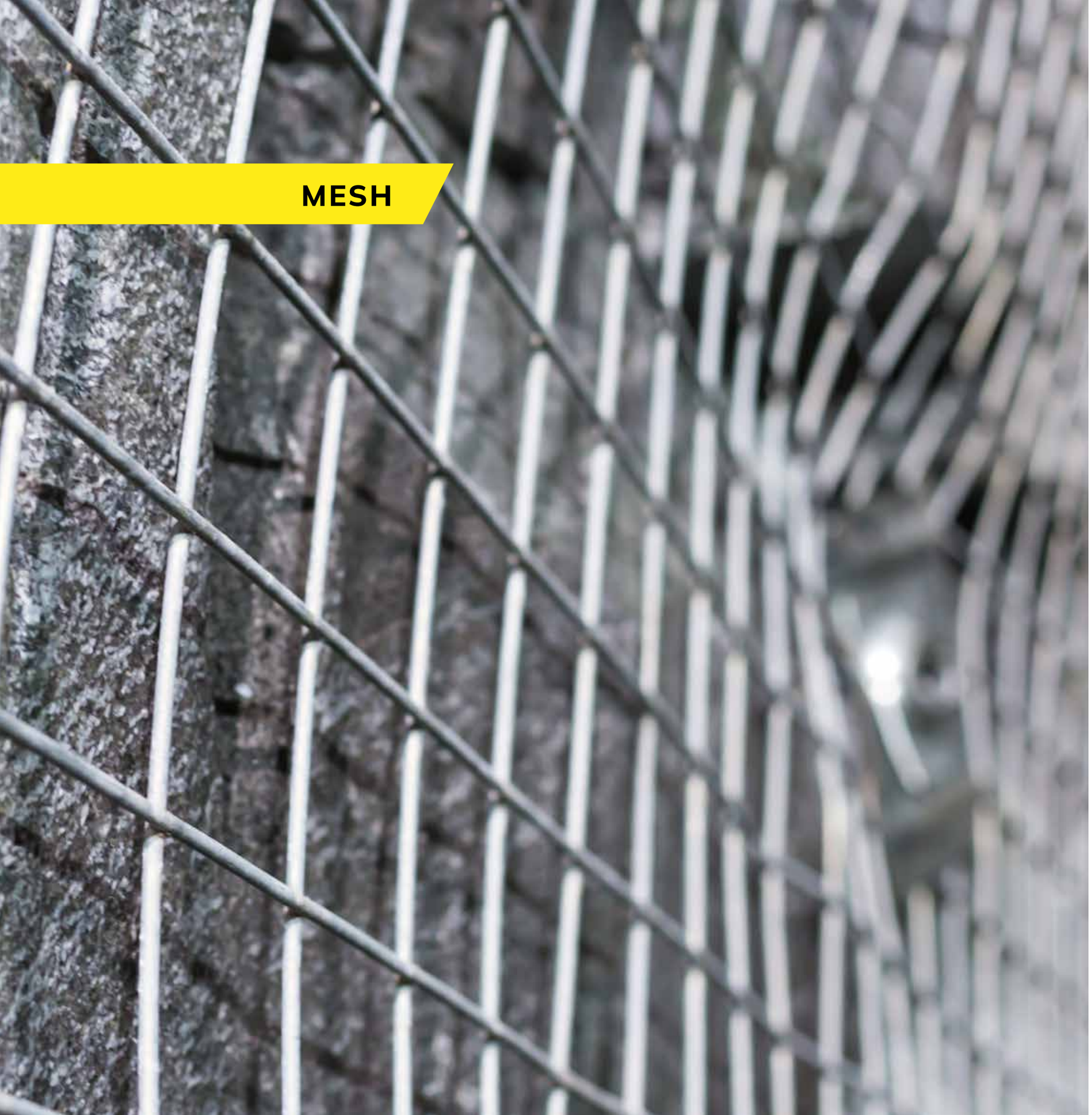
FIELDS OF APPLICATION

- Shotcrete Reinforcement
- Ground Support
- Tunnel Linings
- Void Filling



TECHNICAL PROPERTIES

ESPECIFIC	UNI	VALUE
Name/type		BC54
Tensile resistance	Mpa	640
Young module	Gpa	12
Length	mm	54
Material		Polypropylene
Dosage	Kg/m³	3-6



MESH

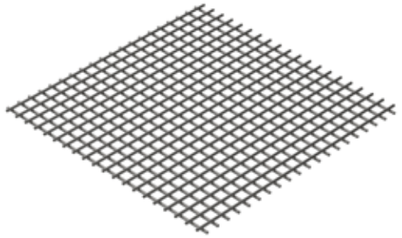
CONTENT

ELECTROWELDED MESH

Electro-welded mesh is made of bars, cold-formed, which intersect orthogonally and are welded by electro-welding at all intersections.

Its main function is to cover all the walls and ceiling of the galleries to provide support in mining and underground projects.

ADVANTAJES OF ITS USE



- High-security support protecting the entire underground excavation area.
- It is flexible, adapting to the movements of the terrain.
- Great resistance at its welding point.
- It can be installed simultaneously with reinforcing the terrain with bolts, combining both systems.

FIELDS OF APPLICATION

- Underground mining
- Protection and safety
- Airflow control
- Rock stabilization and collapse prevention
- Slope stabilization and landslide prevention
- Rock fragmentation control

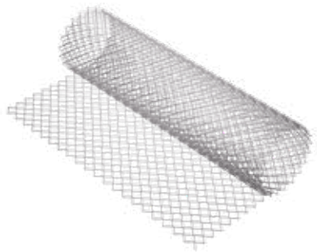
TECHNICAL PROPERTIES

SPECIFICATIONS	UNI	VALUE
Length	mm	1500-6000
Width	mm	1200-2500
Wire diameter	mm	3.15-6
Aperture	mm	50-200
Min cable tension	Mpa	500-750
Finishing		Black or Galvanized
Edges		Points or Flush cut

GALVANIZED WOVEN MESH

Galvanized woven mesh is a type of metal mesh produced by weaving galvanized steel wire. The galvanization process involves coating the steel wire with a layer of zinc to protect it from corrosion and increase its durability.

ADVANTAJES OF ITS USE



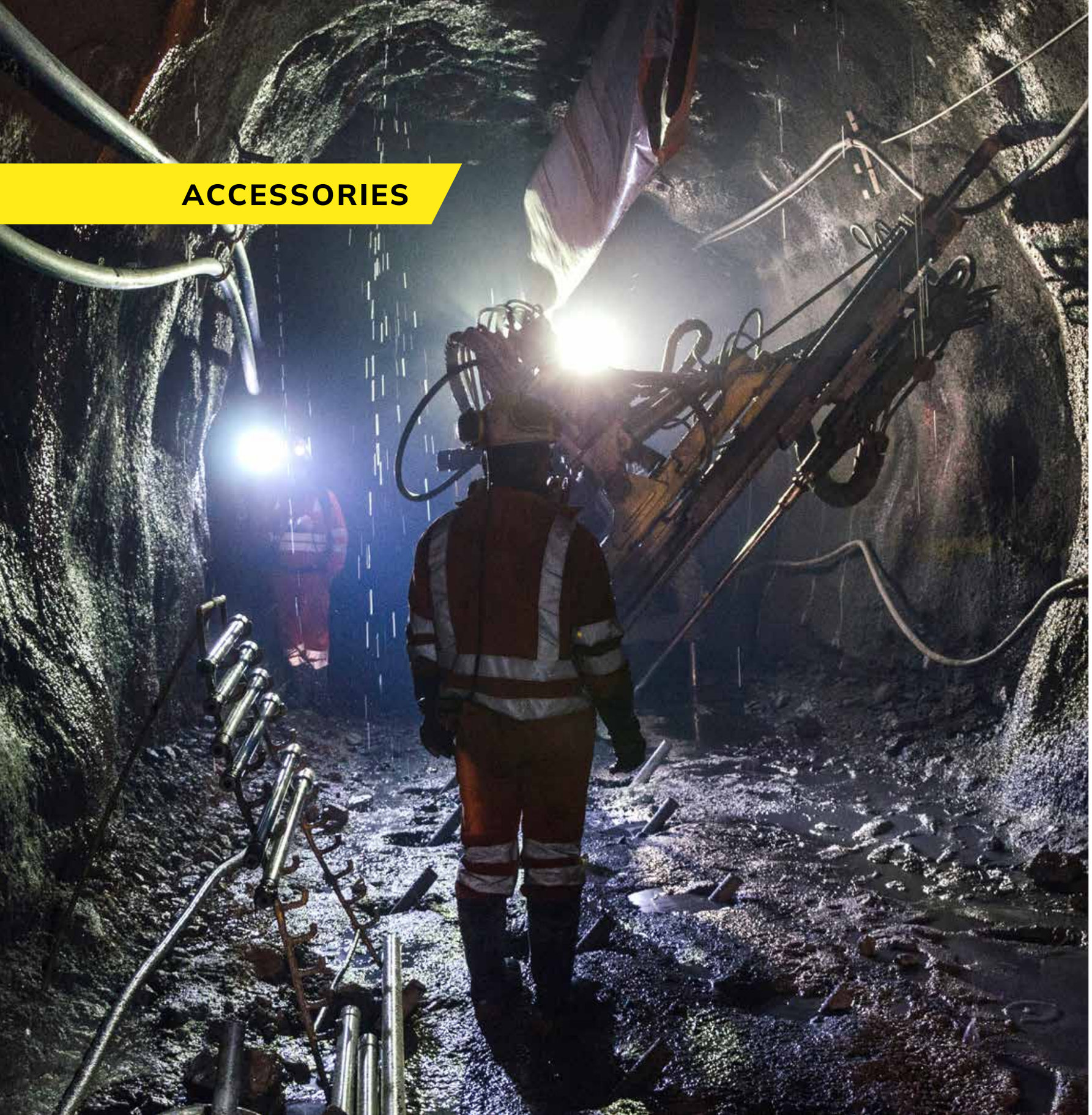
- Resistance to corrosion
- Greater adaptability to the rock mass
- Easy handling and installation
- Higher load resistance than standard woven meshes

FIELDS OF APPLICATION

- Mining and underground projects
- Retaining pillars
- Slope control
- Rock mass retention

TECHNICAL PROPERTIES

MODEL	MEASURES (MM)	OPENING (MM)	WEIGHT (M2)	D WIRE	ROLLS (M2)
ONIX-50.4	2 x 25	50	4.8	4.19	50
ONIX-50.3	2 x 25	50	3.1	3.4	50
ONIX-100.5	2 x 25	100	3.36	5.16	50



ACCESSORIES

CONTENT

HYDROELECTRIC PUMPS

We have high-speed, high-pressure Hydroelectric Pumps for the correct and quick water inflation of the expandable bolts.

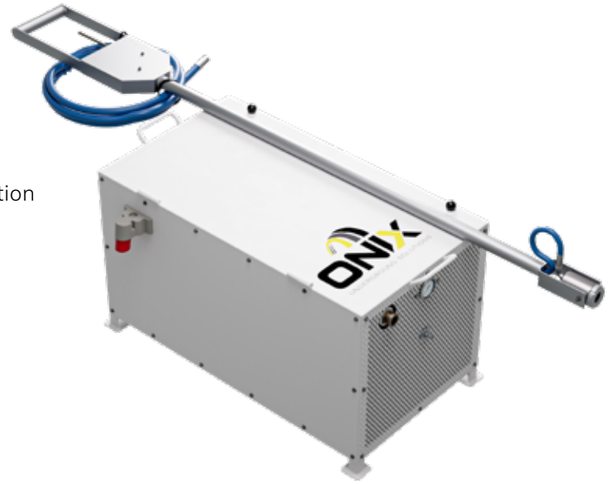
To ensure the proper inflation and installation of these bolts, our Pumps operate at a voltage of 230/400V with an approximate flow rate of 10 liters per minute at a working pressure of 300 bars, considered suitable for the inflation of these bolts.

In addition to the pumps, we have Lances to facilitate manual bolt inflation and various nozzles to properly adapt to the bolts. Thus, a complete inflation kit consists of: Pump + Lance + Nozzle/Handle (*).

(*) There is a type of Nozzle/Handle that is suitable for Standard bolts and another type of Nozzle/Handle that is suitable for Midi and Super bolts.

FEATURES

- Flow rate: 10 liters per minute
- Working pressure: 300 bar
- Motor power: 7.5 HP; 1500 rpm; 230/400V; 50Hz
- Inlet connection: Express hose connection D19
- Outlet connection: JIC 9/1 thread
- Weight: Approximately 85 kg
- Dimensions: Approximately 800 x 500 x 450



PULL TEST EQUIPMENT

Our main concern is the safety and efficiency of the support systems. To ensure this, bolt pull-out tests must be carried out.

This very important test consists of checking the quality and correct installation of the bolts, thus guaranteeing their optimal performance. These tests are essential to complete the quality control cycle of the bolts. We have portable equipment to perform pull-out strength tests on-site where the project is being executed.

They are used for both destructive and non-destructive testing of different types of bolts.

By exchanging the gripping head, our testing equipment can be adapted for expandable rock bolts, split sets, rebar bolts, etc.

COMPONENTS

- Extraction unit
- Jack
- Hoses
- Pressure gauge
- Pump

LED LIGHTING

We offer two types of LED strips to meet the needs of underground mining and tunnel construction companies.

ONC-LED flexible strips are designed for demanding environments. They are built to last, providing **high lumen output**, quick installation, and the ability to connect up to **100 meters in a single chain**. The automatic safety brightness feature in case of power failure, makes the work area safer.

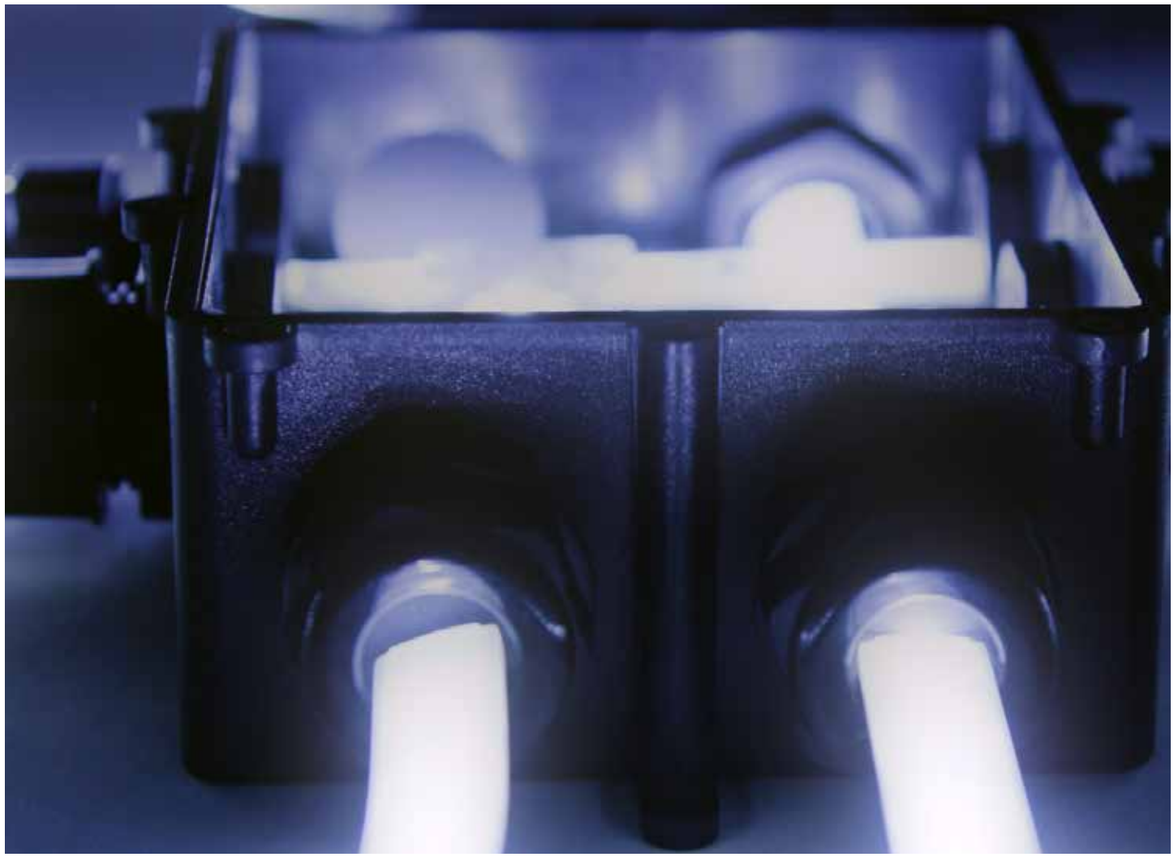
OND-LED strips are the latest generation lighting, and **have been specifically designed for tunnels and mining.** With a unique design featuring a more **robust cover,** discontinuous lighting effect, and the ability to **cover up to 500 meters in a single chain,** it saves installation time and electrical cable costs in underground projects.

ACCESSORIES

- Flexible backup battery
- LED strip dimmer with power protector
- Flexible signal strip (green and red)

FEATURES

- Designed, tested, and used in construction sites around the world
- High lumen output enables mounting at heights of up to 18 meters
- Easy to roll onto the drum with Plug & Play connectors, ready for lighting controls
- Prepared for dimming controller
- Produced with a double silicone and PVC sheath that provides good protection against chemicals and flame-retardant V-0
- Patented 230V AC solution without the need for a controller
- Third-party EMC testing
- Low flicker: PST LM <0.06
- Linkable up to 100 meters (ONC-LED) or 500 meters (OND-LED) with quick connectors
- In case of power failure, the LED strip emits a safety glow for up to 2 hours



TECHNICAL PROPERTIES

AMBIENT TEMP	ONXLED92	ONXLED92	ONXLED92	ONXLED92	ONXLED92
Length	1m	25m	50m	25m	50m
Luminous flux	1300	32 500	65 000	20 000	40 000
System power	16	400	800	225	450
Lumen/M	1300	1300	1300	800	800
Lumen/W	81				
Voltage:	230VAC +/-10% 50/60Hz			110VAC +/-10% 50/60Hz	110VAC +/-10% 50/60Hz
Power factor	>0,9				
Lifetime (L70, B50):	50 000h				
Colour temperature	3/4/6000K				
CRI	>80				
Colour tolerance	<5				
Light distribution angle	120°				
Flicker level PST LM:	<0,06				
Dimmable	Yes				
IK class	IK10				
IP class	IP67				
Ambient temp	-40 - +45 °C				
Incoming cable	3m H07RN-F con conectores rápidos				
Material	Silicona esmerilada con cubierta de PVC				
Max. connectable length	100m				
Flammability UL94	V-0				
Weight (Kg)	0,2	3,3	6,5	3,3	6,5
Dimensions Ø x H mm		350x45	220x105	350x45	220x105
Approval	CE, EMC, LVD				

AGGREGATE AND BULK MATERIALS MANAGEMENT

We turn challenges into opportunities, driving your operation with innovative and quality products

PRODUCTS

CONTENT

FORGED GRINDING BALLS

Our Forged Grinding Balls offer superior strength and durability compared to conventional cast balls. As an integral part of our manufacturing process, we subject the steel to high temperatures and shape it through blows or pressure.

This technique guarantees the creation of steel balls with an exceptionally dense and uniform internal structure.

GENERAL TECHNICAL SPECIFICATIONS

Product Name	Forged Grinding Balls
HS Code	73261100
Size Range	10-160mm
Specification	45#, 50Mn, 60Mn, 65Mn, B2, B3, B4, B6, BL, BG
Surface Hardness	55-66HRC
Impact Value	>12J/cm2
Dropping Test	10,000-20,000 times
Packaging	Bags, Steel drums, Containers

PHYSICAL FEATURES

STEEL SPECIFICATION	IMPACT VALUE (J/CM2)	SURFACE HARDNESS (HRC)	CORE HARDNESS (HRC)	DIAMETER (MM)
60Mn	≥12	55-66	45-65	10-160
65Mn				
#45/C45/1045				
ZT-10				
B2				
B3				
B4				
B6				
BU				
BL				
BG				

CAST GRINDING BALLS

Cast Grinding Balls are a more economical option compared to forged balls without compromising the quality of the end results. In the manufacturing process of cast balls, molten metal is accurately poured into specialized molds to give them shape. We offer a wide range of metal alloys that suit various industrial applications.

Our quality controls allow us to provide cast balls that meet the highest standards of performance and reliability in the field of industrial grinding.

(*) It is important to note that cast balls may exhibit lower durability and be more susceptible to deformations or breakage if the grinding conditions are not intensive. In such cases, we recommend using forged grinding balls.

GENERAL TECHNICAL SPECIFICATIONS

Product Name	Casting Grinding Balls
HS Code	7325910000
Size Range	10-130mm
Specification	Cr (1%-32%) alloying grinding balls/ Ductile cast iron balls
Surface Hardness	45-65HRC
Impact Value	>4J/cm2
Breakage Rate (%)	≤1% (some products lower than 2%)
Dropping Test	Stricter than Industrial standard
Packaging	Bags, Steel drums, Containers

PHYSICAL FEATURES

CAST GRINDING BALLS	SURFACE HARDNESS (HRC)	CORE HARDNESS (HRC)	IMPACT VALUE (J/cm2)	BREAKAGE RATE (%)	DIAMETER (MM)
Cr (23-30%)	58-65	55-65	≥4J	≤1.0	10-130
Cr (18-23%)	58-65	55-65	≥4J	≤1.0	
Cr (14-18%)	58-65	55-65	≥4J	≤1.0	
Cr (10-14%)	58-65	55-65	≥4J	≤1.0	
Cr (7-10%)	≥48	≥45	≥4J	≤1.9	
Cr (4-6%)	≥47	≥44	≥4J	≤1.9	
Cr (1-3%)	≥45	≥43	≥4J	≤2.0	
Ductile cast iron balls (Bainite)	≥50	≥48	≥4J	≤2.0	
Ductile cast iron balls (Martensite)	≥52	≥49	≥4J	≤2.0	

DRILLING

At Onix Underground, we offer a wide variety of high-quality drilling tools designed to ensure exceptional performance and safe operation in tunneling and mining projects.

Our commitment to excellence and innovation enables us to provide reliable and safe solutions that meet the highest industry standards.

TAPERED ROCK DRILLING

DRILL BIT 7° 11° 12°

DIAMETER		N° X BUTTON DIAMETER	
mm	Inches	Front	Gauge
32	1 1/4	1 x 8	3 x 8
32	1 1/4	2 x 7	5 x 7
33	1 19/64	2 x 7	4 x 7
34	1 11/32	2 x 7	4 x 7
35	1 3/8	2 x 7	5 x 7
35	1 3/8	2 x 7	5 x 8
36	1 27/64	1 x 8	3 x 9
36	1 27/64	2 x 7	4 x 7
36	1 27/64	2 x 7	5 x 8
38	1 1/2	1 x 9	3 x 9
38	1 1/2	2 x 8	3 x 9
38	1 1/2	2 x 7	5 x 8
38	1 1/2	2 x 7	5 x 9
40	1 37/64	1 x 9	3 x 9
40	1 37/64	2 x 8	3 x 9
40	1 37/64	2 x 9	3 x 9
40	1 37/64	2 x 7	5 x 9
40	1 37/64	2 x 8	5 x 9
41	1 5/8	2 x 7	5 x 9

DRILL ROD 7° 11° 12°

LENGTH	
mm	Inches
610	2 ´
1220	4 ´
1830	6 ´
2000	6 ´ 7 ´´
2435	8 ´
2600	8 ´ 8 ´´
3200	10 ´ 6 ´´
3655	12 ´
4000	13 ´ 1 ´´
4800	15 ´ 9 ´´
5600	18 ´ 4 ´´
6400	21 ´
7200	23 ´ 6 ´´
8000	26 ´ 2 ´´

PRODUCTION DRILLING

DRILL BIT R25 R28 R32 SR35

DIAMETER		N° X BUTTON DIAMETER	
mm	Inches	Front	Gauge
Puntas Esféricas			
37	1 39/64	2 x 7	5 x 9
38	1 1/2	2 x 8	4 x 9
38	1 1/2	2 x 7	5 x 9
41	1 5/8	2 x 8	5 x 9
43	1 11/16	2 x 9	5 x 9
45	1 3/4	1 x 9	5 x 10
45	1 3/4	3 x 8	6 x 9
Puntas Parabólicas			
37	1 29/64	2 x 7	5 x 9
38	1 1/2	2 x 8	4 x 9
38	1 1/2	2 x 7	5 x 9
41	1 5/8	2 x 8	5 x 9
43	1 11/16	2 x 9	5 x 9
45	1 3/4	2 x 9	5 x 10
45	1 3/4	3 x 8	6 x 9
48	1 7/8	2 x 9	5 x 11
48	1 7/8	3 x 8	6 x 9

DRILL ROD R25 R28 R32 SR35

DIAMETER		DIAMETER	
mm	Inches	mm	Inches
2400	7 ´ 10 ´´	28	1 1/4
3090	10 ´ 11/2 ´´	28	1 1/4
3400	11 ´ 13/4 ´´	28	1 1/4
4000	13 ´ 13/8 ´´	28	1 1/4
4310	14 ´ 11/2 ´´	28	1 1/4
4920	16 ´ 11/2 ´´	28	1 1/4
5530	16 ´ 11/2 ´´	28	1 1/4
3090	10 ´ 11/2 ´´	32	1 3/8
3700	12 ´ 11/2 ´´	32	1 3/8
4000	13 ´ 13/8 ´´	32	1 3/8
4310	14 ´ 11/2 ´´	32	1 3/8
4920	16 ´ 11/2 ´´	32	1 3/8
5530	18 ´ 11/2 ´´	32	1 3/8
6100	20 ´	32	1 3/8
3700	12 ´ 11/2 ´´	35	1 3/8
4310	14 ´ 11/2 ´´	35	1 3/8
4920	16 ´ 11/2 ´´	35	1 3/8
5530	18 ´ 11/2 ´´	35	1 3/8
6400	21 ´	35	1 3/8

BENCH DRILLING

DRILL BIT 7° 11° 12°

DIAMETER		N° X BUTTON DIAMETER	
mm	Inches	Front	Gauge
Spherical Buttons			
64	2 1/2	4 x 10	8 x 10
64	2 1/2	3 x 10,1 x10	6 x 11
70	2 3/4	4 x 11	8 x 11
70	2 3/4	3 x 10,1 x10	6 x 13
70	2 3/4	3 x 10,1 x10	8 x 11
76	3	4 x 11	8 x 11
76	3	4 x 11,1 x11	8 x 11
76	3	4 x 11,1 x11	8 x 12
89	3 1/2	4 x 13	8 x 13
89	3 1/2	5 x 13	8 x 13
89	3 1/2	6 x 11	8 x 12
89	3 1/2	4 x 11,1 x11	8 x 13
89	3 1/2	4 x 13,1 x13	8 x 13
Parabolic Buttons			
64	2 1/2	4 x 10	8 x 10
64	2 1/2	3 x 10,1 x10	6 x 11
70	2 3/4	4 x 11	8 x 11
70	2 3/4	3 x 10,1 x10	6 x 13
70	2 3/4	3 x 10,1 x10	8 x 11
76	3	4 x 11	8 x 11
76	3	4 x 11,1 x11	8 x 11
76	3	4 x 11,1 x11	8 x 12
89	3 1/2	4 x 13	8 x 13
89	3 1/2	5 x 13	8 x 13
89	3 1/2	6 x 11	8 x 12
89	3 1/2	4 x 11,1 x11	8 x 13
89	3 1/2	4 x 13,1 x13	8 x 13

DRILL ROD T38 T45 T51

LENGTH		DIAMETER	
mm	Ft	mm	Inches
1830	6 ´	39/46/52	1 3/4
2435	8 ´	39/46/52	1 3/4
3050	10 ´	39/46/52	1 3/4
3660	12 ´	39/46/52	1 3/4
4270	14 ´	39/46/52	1 3/4
5530	18 ´	39/46/52	1 3/4
6095	20 ´	39/46/52	1 3/4
1525	5 ´	39/46/52	1 3/4
1830	6 ´	39/46/52	1 3/4
3050	10 ´	39/46/52	1 3/4
3660	12 ´	39/46/52	1 3/4
4270	14 ´	39/46/52	1 3/4
5530	18 ´	39/46/52	1 3/4
6095	20 ´	39/46/52	1 3/4

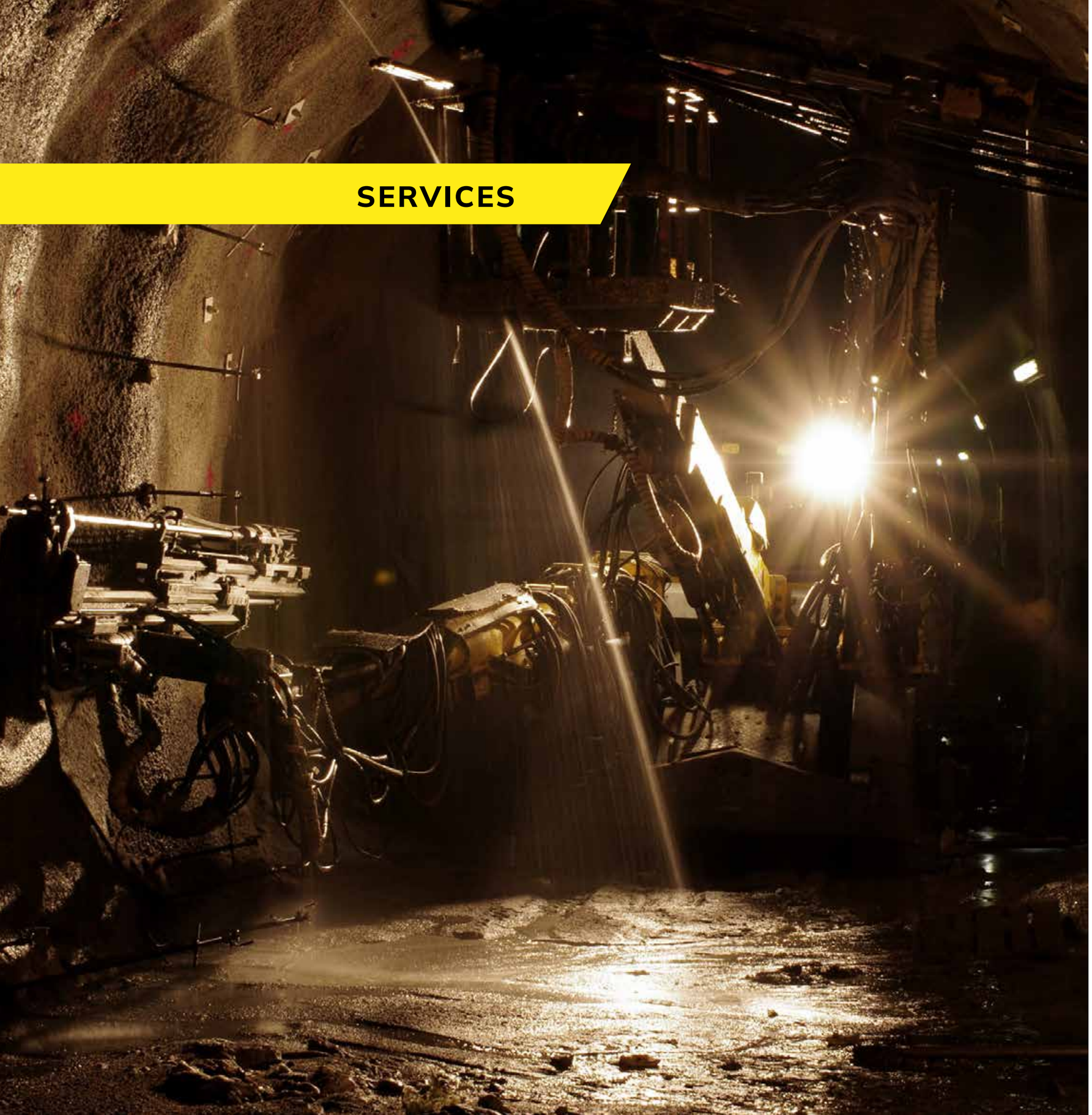
ADAPTERS

SANVICK AND EPIROC COMPATIBLE SHANK ADAPTER

ROCK DRILL	THREAD TYPE	DIAMETER (mm)	LENGTH (mm)
HL700	T45	52	600
HL710-52	T45	52	600
HL710PE-52	T51	52	600
HL700LH			
HL710S-52			
HL710SPE-52			
T45			
HL650-52			
HL800T-52			
HL800T			
PE-52			
HL810T-52			
HF810T-52			
HL 850S	T45	52	670
	T51	52	670
HL 1000	T45	52	670
HL1010	T51	52	670
HL1000S	T45	52	590
HL1010S-52	T51	52	590
HL1000-60	T51	60	670
	GT60	60	670
HL1010-60	ST58	60	670
HL1000-80	GT60	80	760
HL1010-80			

MINING SERVICES

“Professional services that guarantee the safety and efficiency of your mining operations.”



SERVICES

CONTENT

PULL TESTING

At Onix Underground, we offer a comprehensive pull testing service designed to ensure the performance of EMC bolts, split sets, welded wire mesh, and other support materials.

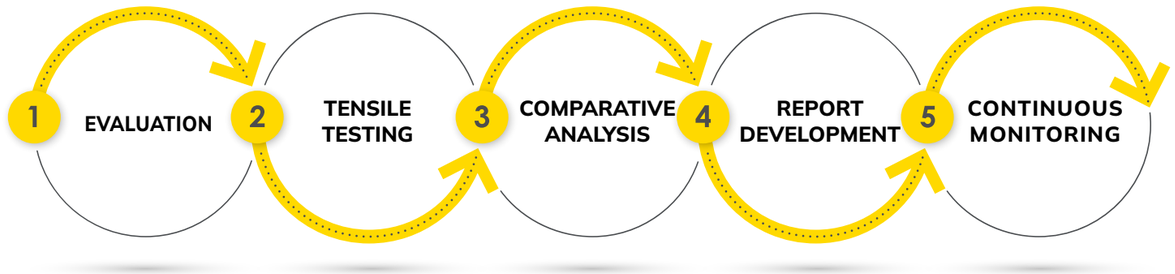
The proven combination of years of experience and advanced resources, backed by our meticulous approach, allows us to accurately measure the tensile capacity, deformation, and behaviour of these products under specific loads. This ensures safety and stability in underground mining operations, providing our clients with the peace of mind that their structures are properly reinforced.

PULL TESTING BENEFITS

- Comprehensive evaluation of reinforced areas
- A record of the strength and deformation of the installed support elements
- A solid understanding of the specific behaviour of anchoring elements with the ground
- A continuous monitor to verify the performance of the installed reinforcements
- Ongoing advice and support as needed

We offer efficient and quality solutions to control structural reinforcement in your underground mining operations

ONIX METHOD



1. EVALUATION

We evaluate the support areas to be examined, establishing a detailed plan for tensile testing of strategically located support elements.

2. TENSILE TESTING

We apply gradual force to the support elements employing different methodologies, gathering precise data of force and deformation to evaluate the load-bearing capacity and strength.

3. COMPARATIVE ANALYSIS

We compare the results obtained on-site with those conducted in our laboratory and those of an accredited external laboratory. This analysis of the data guarantees the accuracy and reliability of our reports.

4. REPORT DEVELOPMENT

- Summary of the results obtained during the tensile tests.
- Graphs illustrating the relationship between applied force and deformation.
- 3D modelling that parameterises the behaviour of the anchoring element with the terrain, offering a precise and detailed visual rendering. (*)
- Recommendations- our technical team highlights important aspects to consider, based on their observations during the evaluation and testing process.

5. CONTINUOUS MONITORING

We conduct periodic monitoring to verify the performance of the installed reinforcements, offering advice and support as required.

(*) En algunos proyectos

TECHNICAL CONSULTING

Performing a technical consultancy on support systems identifies areas for improvement and also enhances the efficiency and safety of mining operations.

At Onix Underground, we have a skilled team with extensive experience in the mining industry, enabling us to offer comprehensive and personalized solutions to optimize support systems and elements.

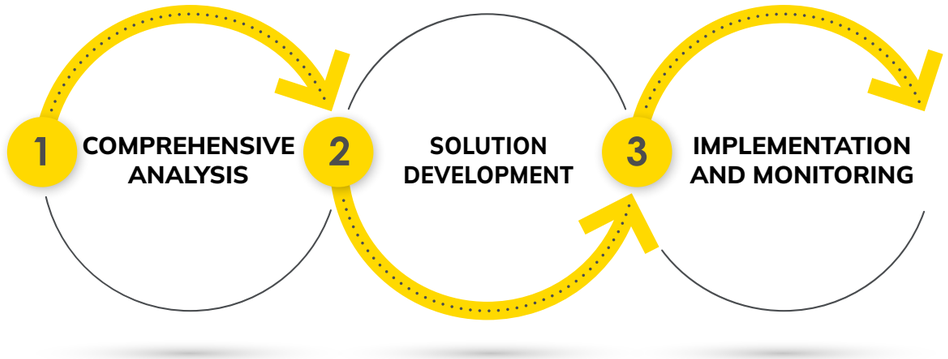
Our technical consultancy is built on three fundamental pillars; analysis of the support systems in use, providing specific solutions, and continuous monitoring. These pillars form the foundation of our approach to ensuring tangible and lasting improvements in the safety and efficiency of mining operations.

TECHNNICAL CONSULTING BENEFITS

- Increased efficiency and safety in your mining operations.
- Identification of areas for improvement.
- Implementation of personalized solutions tailored to your specific needs.
- Comprehensive assistance in the implementation and continuous monitoring of solutions.

Committed to helping you achieve your goals with technical consultancy solutions tailored to your needs

ONIX METHOD



1. COMPREHENSIVE ANALYSIS

- We analyse the support systems and elements used in the mine, assess their current performance, and identify potential areas for improvement.
- We evaluate the installation of support systems to ensure it has been carried out correctly and safely.
- We identify the problems and difficulties encountered by clients in their support projects.
- This includes analysing the effectiveness of existing systems and assessing operational and safety challenges they face.
- We propose safe and effective solutions to address any potential issues, focusing on improving both the installation and performance of support systems.

2. SOLUTION DEVELOPMENT

Based on the collected data and our experience, we develop customized solutions that address the specific needs of the client.

This may include optimizing product selection, improvements in installation and maintenance, and the implementation of new technologies.

3. IMPLEMENTATION AND MONITORING

We work closely with our clients to implement solutions.

Additionally, we conduct continuous monitoring to ensure the effectiveness and long-term success of the implemented improvements.

TECHNICAL TRAINING

Training personnel in reinforcement systems is not only fundamental but also a key investment in reducing risks, increasing safety, and improving operational efficiency in the mining industry.

At Onix Underground, we offer a comprehensive and personalized technical training service in fortification reinforcement systems, specifically designed for companies seeking to enhance their knowledge and expertise in this area.

Our team of engineers and geotechnicians teach theoretical and practical sessions, covering a wide range of topics related to support systems.

Our training provides participants with knowledge and practical skills that can later be applied on-site, ensuring a safer and more efficient working environment.

TECHNICAL TRAINING BENEFITS

Trained personnel gain specialized knowledge in support products and systems, which leads to improvements in operational efficiency and safety at the mine, an increase in responsiveness and problem-solving capabilities of trained personnel, who learn more about how to avoid risks. Overall, our technical training contributes to optimizing investment in personnel, infrastructure and resources.

We provide our clients with the tools and knowledge necessary to achieve success in their mining operations

ONIX METHOD

1. NEEDS ASSESSMENT

We analyse the needs and level of experience of each client and tailor the course to meet their specific needs and/or requirements.

2. COURSE DESIGN

Our team of engineers and geotechnicians design customized training programs, covering a wide range of topics related to support systems in the mining industry.

3. PRACTICAL AND THEORETICAL TRAINING

We combine theoretical and practical sessions to provide participants with a comprehensive understanding of support elements and systems, as well as best practices in their application and maintenance.

4. INTERACTION WITH EXPERTS

Our teaching team, composed of expert engineers and geotechnicians, share their experience and knowledge with participants.

5. CONTINUOUS MONITORING

Upon completion of the training, we offer additional support to address any questions or concerns that may arise during the implementation of the acquired knowledge.

DRILLING AND BLASTING

If you are looking to optimize rock fragmentation and maximize efficiency in your mining operation, Onix Underground offers a comprehensive and safe drilling and blasting service.

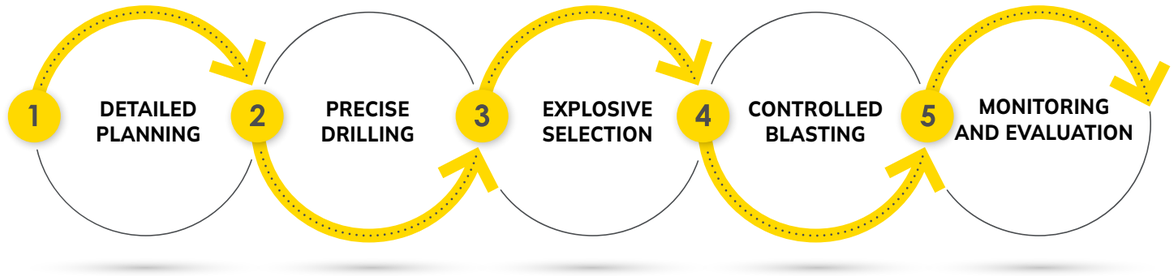
Our approach is based on a detailed analysis of the geological characteristics and specifications of each project, allowing us to determine the most suitable drilling and blasting strategy.

Our goal is to ensure optimal results and superior performance in every mining project, which we achieve for our clients with top-notch equipment and expertise, backed by cutting-edge technology and industry best practices.

SERVICE BENEFITS

- Improvements in rock fragmentation efficiency.
- Reduction in operational and maintenance costs.
- Increase in productivity and profitability.
- Compliance with safety and environmental standards.
- Access to expert technical support.

ONIX METHOD



1. DETAILED PLANNING

We consider all the project's geological characteristics and specifications to determine the most suitable drilling and blasting strategy

2. PRECISE DRILLING

We utilize modern equipment and advanced drilling techniques to ensure precise and uniform drilling, tailored to the specific needs of each site.

3. EXPLOSIVE SELECTION

Our experts carefully select the most appropriate explosives and accessories to optimize rock fragmentation and minimize environmental impact.

4. CONTROLLED BLASTING

We conduct controlled blasting using innovative methods and advanced monitoring technology to ensure worker safety and minimize vibrations and dust.

5. MONITORING AND EVALUATION

We monitor the entire drilling and blasting process to ensure compliance with established safety and quality standards.

THE POWER OF SAFETY

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