LIEBIG Superplus BLS range

Unique automatic self-undercut anchor offering high load capacity with complete reliability

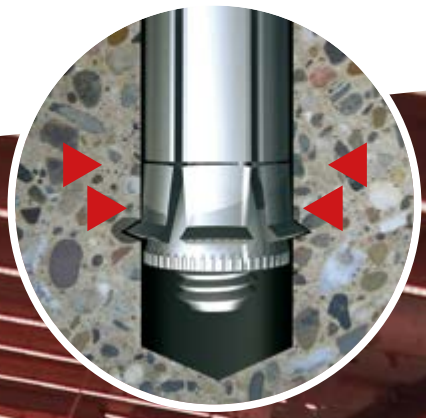
Bringing it together.

LIEBIG Superplus BLS range

Unique technology, unrivalled performance

Since 1946, LIEBIG's unique anchoring technology has become synonymous around the world with the highest levels of safety-critical products. And since 2017, the LIEBIG brand has been part of the EJOT Group.

LIEBIG Superplus BLS is the only genuine market-wide self-undercutting anchoring system that does not require special setting tools. Unique in design, the undercut is created when the installation torque is applied, and the sleeve's outer cutting teeth expand into the base material. The result is a high-strength mechanical interlock in both cracked or non-cracked concrete, which has a proven track record in safety-critical applications worldwide.



Contents

The self-undercut anchor that does not require any special setting tools

The design principle of the LIEBIG Superplus BLS range is simply unique.

Available in zinc plated carbon steel and A4 stainless steel, its design offers the high load capacity and reliability of an undercut anchor, with the ease of installation normally associated with an expansion anchor.

That means that, unlike any other competing product, the Superplus range does not require the expense of any special drill bits or setting tools.

Performance benefits and characteristics

- Unique automatic self-undercut / mechanical interlock anchor
- Very high load performance
- Setting is torque controlled - no special tools required
- Minimal expansion forces allow small spacings and edge distances
- M8 – M16, push-through or pre-installation options
- Two embedment depths per anchor diameter
- Range includes shallow embedment option
- Simplest, quickest and safest solution available
- For static, quasi-static and seismic loads
- UKTA approval
- ETA approval
- ACI 355 Nuclear Performance Standard

Type BLS
Stud with nut

Type BLS-P
Extended stud with nut

Type SLS
Hexagonal bolt

Type SKLS
Countersunk screw

Type ILS
Internal thread

Product material

- Grade 8.8 carbon steel, zinc plated
- A4-80 stainless steel

Product range

- BLS & BLS-P - M8, M12 and M16
  - zinc plated carbon steel
- ILS: M8
  - zinc plated carbon steel
- BLS (A4), SLS (A4), SKLS (A4)
  - A4 stainless steel
- Effective clamping thickness 0 - 300mm

Base material

- Cracked and non-cracked concrete: C20/25 to C50/60

Load range

- Tension: N_{perm} = 4.3 - 59.8 kN
- Shear: V_{perm} = 4.3 - 91.2 kN

Typical application area

- Power plants (nuclear, hydroelectric & fossil etc)
- Tunnel ventilation, jet fans
- Tunnel M&E: overhead lines, catenary systems
- Machinery
- Petrochemical and industrial plants
- Façades
- Structural steel work
- Base plates
- Safety barriers and guide rails
- Storage racking
- Lifts and elevator variations
- Cranes and crane rails

Approval

- ETA-01/0011 - Option 1
  A4 stainless steel / zinc plated carbon steel
- UKTA - Option 1
  A4 stainless steel / zinc plated carbon steel

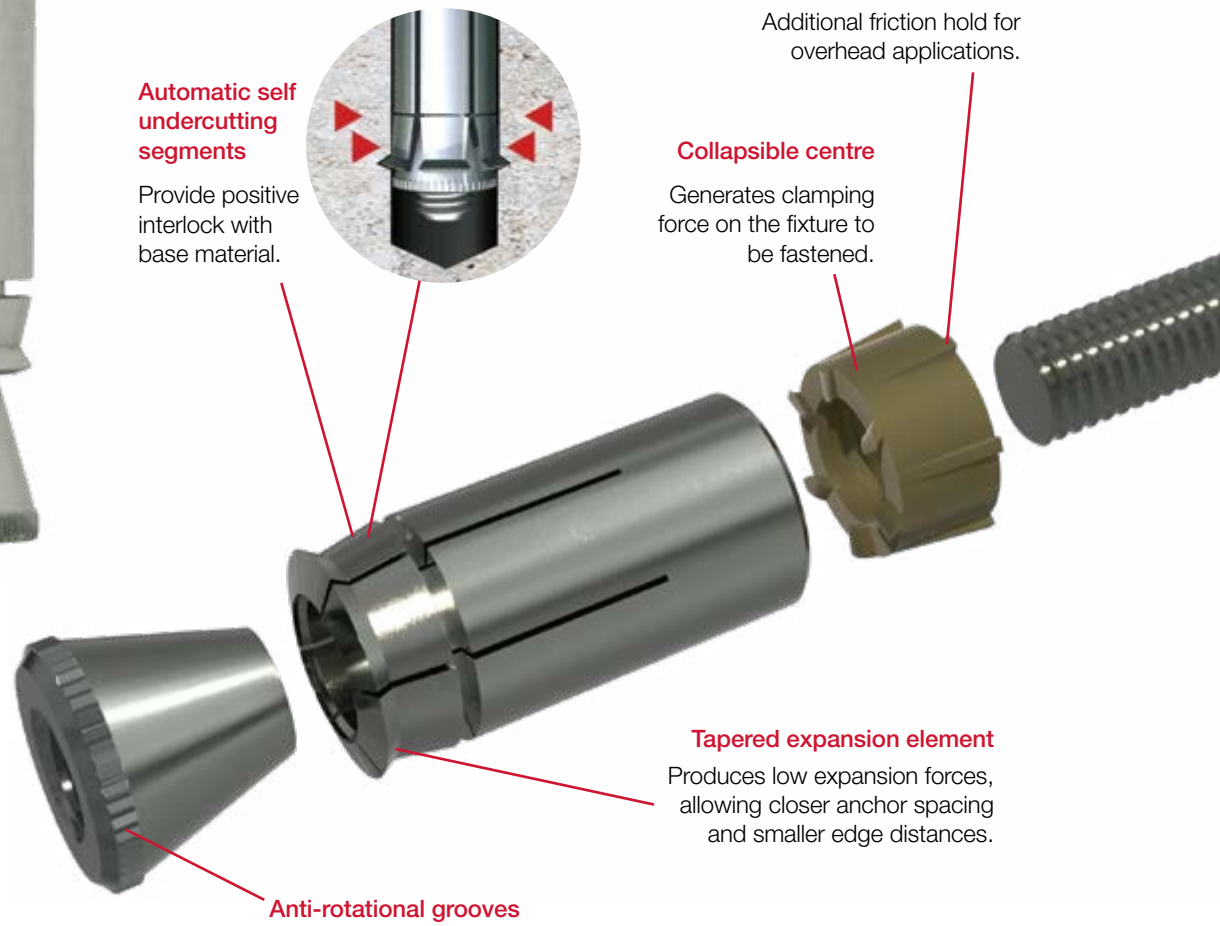
The unique heavy-duty self-undercutting anchor that gives more kN per £!

How the Superplus BLS principle works

When specified torque is applied, the anchor's cone is pulled upwards causing the sleeve's outer cutting teeth to expand into the base material.

The result is an extremely high strength and durable mechanical interlock with the base material, most commonly cracked or non-cracked concrete.

The localised pressure required to create the interlock means very low expansion forces are created - which in turn means that reduced anchor spacings and edge distances can be achieved.



Post-installed anchor

Pre-installed anchor

Pre-installation / post-installation option

For pre-installed application scenarios, the BLS-P provides an ideal solution due to its extended threaded rod. This is designed to be used where the anchor is installed into the concrete and the baseplate is dropped in over the top, prior to torque being applied.

All remaining Superplus BLS, SLS, SKLS and ILS variants provide installers with a very simple push-through installation where drilling and anchor insertion can be made directly through the baseplate.

Distance sleeve

Provides a higher shear resistance. Design prevents movement during overhead applications.

Thicker washer / larger nut

Provides improved clamping.

Threaded rod

In conjunction with the distance sleeve, the threaded rod is customisable allowing for bespoke lengths.

Depth set indicator

Visual aid for correct, safe and simplified installation check.

Threaded rod

Grade 8.8 or A4/80 for higher tensile and shear resistance.

Modularity means that customised solutions are easily achievable

The modular design of Superplus BLS adds to its flexibility further because bespoke lengths of the main threaded bolt allied to simple adjustments to the distance sleeve can be made with ease, without significantly adding to cost and lead times.

In reality, very few applications are genuinely standard. The Superplus BLS concept is highly configurable to requirements, rather than expecting the application to be designed to suit the anchor's own characteristics.

Superplus BLS size range guide

BLS M12 - 20 / 80 / 15

- Thread size
- Drill bit diameter
- Effective embedment depth (h_{ef})
- Maximum fixture thickness (h_{ef})

Standard size range

Thread size	Size - Drill ø / Anchorage depth h_{ef} / t_{fix}	t_{fix}	BLS (ZP)	BLS-P (ZP)	BLS (A4)	SLS (A4)	SKLS (A4)	ILS (ZP)
M8	M8-14	-	-	-	-	-	-	-
	M8-14/40/15	15	-	-	•	•	•	-
	M8-14/40	25	-	-	-		-	-
	M8-14/60	25	-	-	-	-	-	-
	M8-14/80	-	-	-	-	-	-	NO ETA
	M8-14/80/25	25	•	-	•	•	•	-
M12	M12-20/80/15	15	•	•	•	•	•	-
	M12-20/80/30	30	•	-	•	-	-	-
	M12-20/150/30	30	•	•	-	-	-	-
M16	M16-25/150/30	30	•	-	•	-	-	-
	M16-25/150/40	40	-	•	-	-	-	-
	M16-25/200/40	40	•	•	-	-	-	-
	M16-25/200/60	60	•	-	-	-	-	-

A4 = A4-80 stainless steel ZP = Zinc plated carbon steel

Special size range

Product Variant		Anchor Diameter	M8		M12		M16	
		Effective Embedment Depth h_{ef}	40	80	80	150	150	200
BLS		Max Fixture Thickness t_{fix} (mm)	100	150	200	250	250	300
BLS-P		Max Fixture Thickness t_{fix} (mm)	100	150	200	250	250	300
SKLS		Max Fixture Thickness t_{fix} (mm)	100	150	200	250	250	300

Other Superplus BLS variants

Superplus SD

- Push through installations
- Used for fixing step irons.
- A4-80 stainless steel

Superplus LPA

- Retrofitting grounding systems to reduce stray current from rebar
- A4-80 stainless steel

ASK YOUR EJOT SALES ENGINEER FOR DETAILS

Calculation software

EJOT's Anchor-fix dimensioning software is a 'go-to' tool to assist designers with pre-planning through to specification detailing.

The program was developed for structural engineers, specifiers, engineers and technicians to calculate the load-carrying capacity of anchor bolts in concrete substrates - allowing data to be archived for reference.

Download here:
www.ejot.com/software-anchorfix

On site testing and support

When specifying outside of any standard technical parameters our technical team will recommend an on-site test report, carried out by a qualified EJOT engineer.

No-one can second guess the integrity of substrates. We want our customers to have absolute peace of mind and confidence in the match between fixing and substrate - and the correct installation process.

All of our field-based engineers are CFA approved testers.

Approvals / certifications / applications

Description of document		Authority / laboratory	ID	Additional info
United Kingdom technical assessment		British Board of Agrement	UKTA-0836-22/6408	
European technical assessment		Centre Scientifique et Technique du Bâtiment	ETA-01-0011	ETAG 001-1 Option 1
Fire resistance		Centre Scientifique et Technique du Bâtiment	ETA-01-0011	EOTA TR 020 - Evaluation of anchorages in concrete concerning resistance to fire
Fire resistance		Centre Scientifique et Technique du Bâtiment	ETA-01-0011	EOTA TR 045 - Design of metal anchors for use in concrete under seismic actions

Static and quasi-static loads

Recommended loads

BLS, BLS-P, SLS, SKLS

The data shown on the following tables is based on:

- ETA / UKTA approved anchors
- Concrete C20/25, $f_{ck,\ cube}$ = 25 N/mm²
- Installation has been done correctly (see pages 12 and 13)
- Without influence of edge and spacing distances

Zinc plated carbon steel anchors: BLS, BLS-P

		M8		M12		M16	
Effective anchorage depth h_{ef}		40	80	80	150	150	200
Non-cracked concrete							
Tensile N_{rec}	kN	6.1	13.9*	17.2	32.1	44.1	59.8*
Shear V_{rec} push through installation	kN	6.1	23.7*	34.4	40.0*	67.4*	67.4*
Shear V_{rec} pre-set through installation (BLS-P)	kN	6.1	8.6	19.3*	19.3*	35.9*	35.9*
Cracked concrete							
Tensile N_{rec}	kN	4.3	7.6	11.9	19.0	23.8	35.7
Shear V_{rec} push through installation	kN	4.3	23.7*	24.6	40.0*	63.0	67.4*
Shear V_{rec} pre-set through installation (BLS-P)	kN	4.3	8.6	19.3*	19.3*	35.9*	35.9*
Recommended bending moment $M_{rec,s}$	Nm	17		60		152	

*Failure mode = steel The partial safety factor for action is γ = 1.4

A4 stainless steel anchors: BLS-A4, BLS-P-A4, SLS-A4, SKLS-A4

		M8		M12		M16	
Effective anchorage depth h_{ef}		40	80	80	150	150	200
Non-cracked concrete							
Tensile N_{rec}	kN	6.1	13.1*	17.2	30.1*	44.2	56.1*
Shear V_{rec} push through installation	kN	6.1	23.7*	34.4	48.5*	88.4	91.2*
Cracked concrete							
Tensile N_{rec}	kN	4.3	5.7	11.9	19.0	28.6	28.6
Shear V_{rec} push through installation	kN	4.3	23.7*	24.5	48.5*	63.0	91.2*
Recommended bending moment $M_{rec,s}$	Nm	16		56		143	

*Failure mode = steel The partial safety factor for action is γ = 1.4

Fire resistance

Recommended loads

Design method according to EOTA TR 020

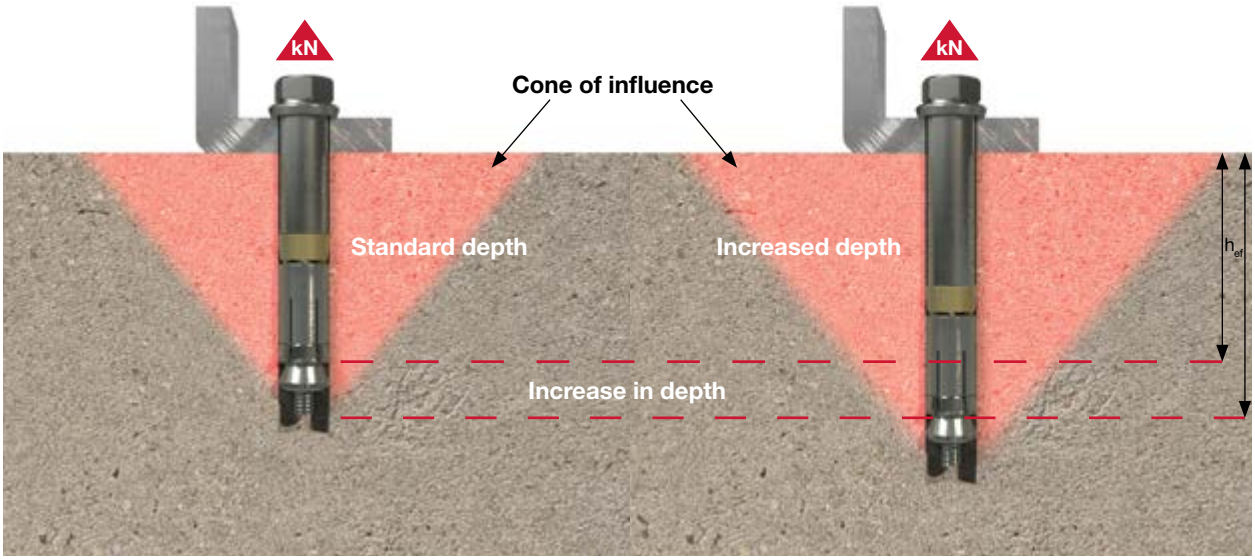
The data of the following table is based on:

- ETA-01/0011: Zinc plated and A4 stainless steel anchors
- UKTA: Zinc plated and A4 stainless steel anchors
- Concrete C20/25, $f_{ck,cube}$ = 25 N/mm²
- Without influence of edge and spacing distances
- Installation procedure is correct and according to parameters given on pages 12 and 13

				M8		M12		M16	
		Effective anchorage depth h_{ef}	mm	40	80	80	150	150	200
		Cracked and non-cracked concrete							
Zinc plated	R30	Tensile N_{rec}	kN	0.37		1.70		3.10	
		Shear V_{rec}	kN	0.37		1.70		3.10	
	R120	Tensile N_{rec}	kN	0.18		0.84		1.60	
		Shear V_{rec}	kN	0.18		0.84		1.60	
A4 stainless steel	R30	Tensile N_{rec}	kN	0.73		2.50		4.70	
		Shear V_{rec}	kN	0.73		2.50		4.70	
	R120	Tensile N_{rec}	kN	0.37		1.30		2.50	
		Shear V_{rec}	kN	0.37		1.30		2.50	

In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{M,FI}$ = 1.0 is recommended

Cone of influence



The above diagram shows how increasing the effective embedment depth of the anchor achieves a greater cone of influence and a greater resistance from the concrete which results in a greater tensile resistance from the anchorage.

Installation data

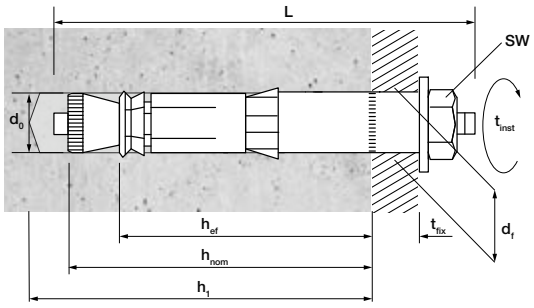
BLS, BLS-P, BLS-A4, SD(M8), SLS-A4, SKLS-A4

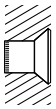
			M8		M12		M16	
Parameters and anchor sizes								
Effective anchorage depth h_{ef}		mm	40	80	80	150	150	200
Nominal anchorage depth h_{nom}		mm	52	92	96	166	168	218
Drill hole diameter d_0		mm	14		20		25	
Diameter of the drill bit at the upper tolerance limit $d_{cut,max} \leq$		mm	14.50		20.55		25.55	
Depth of drilled hole to deepest point $h_1 \geq$		mm	60	100	105	175	185	235
Diameter of clearance hole in the fixture	In-place installation (BLS) $d_f \leq$	mm	16		21		26	
	Mounting on the threaded bolt (BLS-P /dist. Mounting) $d_f \leq$		10		14		18	
Installation torque T_{inst}		Nm	25		80		180	
Minimum thickness of base material h_{inst}		mm	100	160	160	300	300	400

Push-through installation

BLS, BLS-A4, SLS-A4, SKLS-A4

- BLS and SD versions installed through fixture using an ordinary hammer and tightened to specified torque.





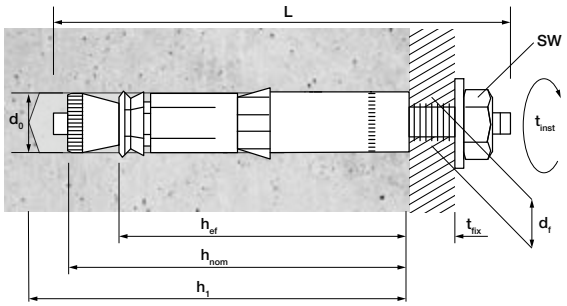
SKLS-A4

- Hex drive.

Pre-set installation

BLS-P

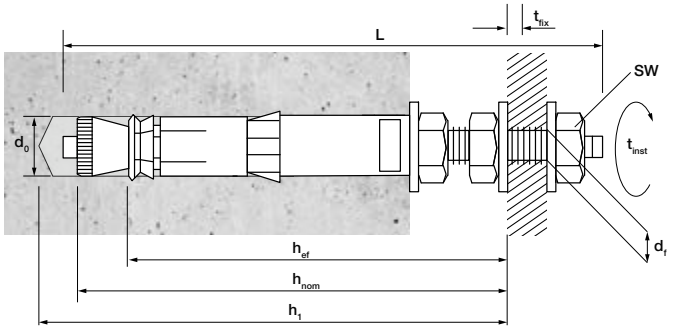
- BLS-P versions installed into the drill-hole using an ordinary hammer. Then, nut and washer are removed, fixture installed, washer and nut installed, and tightened to the specified torque.



Distance mounting

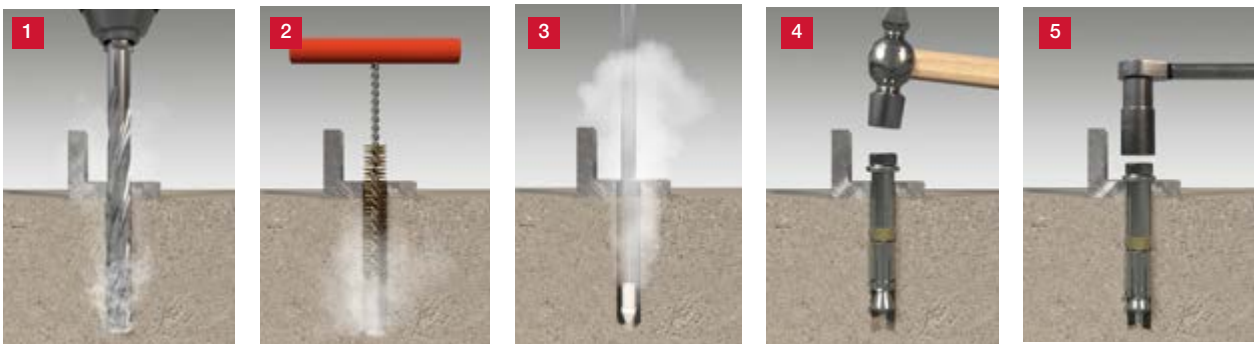
BLS-P

- BLS-P anchors can be used for distance mountings.



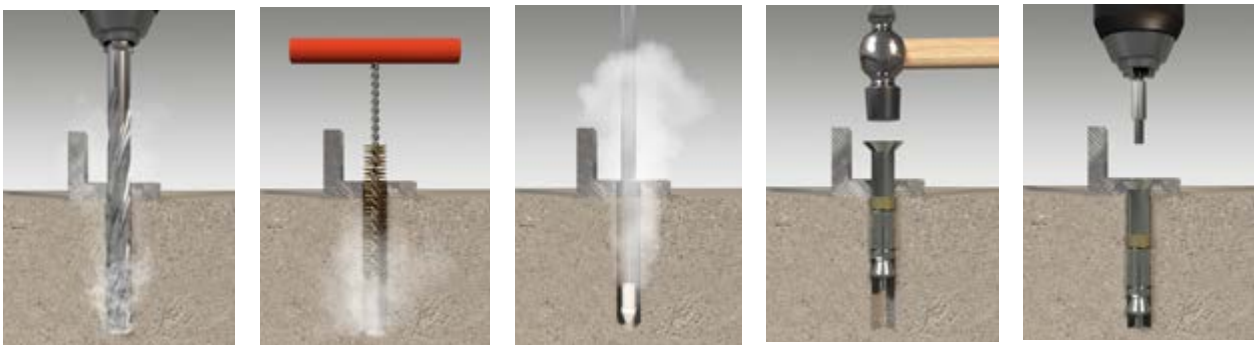
Installation instructions

BLS, BLS-A4, SD, SLS-A4



BLS-P

SKLS-A4



1 - Standard SDS drill procedure.
2 - Best practice dust removal - brush / pump.
3 - Repeat brush / pump procedure.
4 - Insert anchor.
5 - Apply specified torque. 2 x audible clicks will be heard from the torque wrench.

Watch our YouTube installation guides

Visit our YouTube channel to watch our clear and concise guides on Superplus installation. Scan the QR codes right or visit **youtube.com/@ejotcouk** and search for Superplus BLS.

PRODUCT ANIMATION

INSTALLATION VIDEO

Installation tools and accessories

With the vast amount of research and development invested into the design and manufacture of all EJOT fastening systems, installation tools are of equal importance in achieving optimised performance and correct function of product.

These tools and accessories have been designed specifically for use with EJOT anchoring products to deliver correct installation features and to maximise efficiency for the installer.

SDS drill bits

Vortex-SDS dust reduction

Metal brushes

EJOT blow-out pump

For more information on the EJOT tools and accessories range, visit EJOT online or talk to your EJOT sales engineer

VISIT the webshop at ejot.co.uk

CALL customer service on 01977 687 040

TALK to your EJOT sales engineer

Scan the QR code to find your regional contacts

Notes

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