SMP Engineering LLC

26 W. Fabish Dr.,
Buffalo Grove, IL, 60089
+1 847 997 39 17
www.smp-tunnel.com

Receiving Bank Address:
850 S Buffalo Grove Rd, Buffalo Grove,
IL, 60089

Technical and Commercial Offer

6/14/2024

To Whom it May Concern

Dear Sir,

Last year Tunnel Service and SMP Engineering purchased two earth pressure balance tunnel boring machine for tunnel ID 3000 mm (10 ft). The project for which the TBM was purchased was cancelled by the customer, so the board took the decision to sell the brand-new tunnel boring machines with a good discount in the market. The main drive, all cylinders, PLC system, all moving parts of the TBM were produced in the USA and Germany. The assembly was carried out at a WIRTH factory in China will full technical support of the specialists of our company.

If you need any additional information or technical questions about the tunnel boring machine in the USA, please contact our representatives:

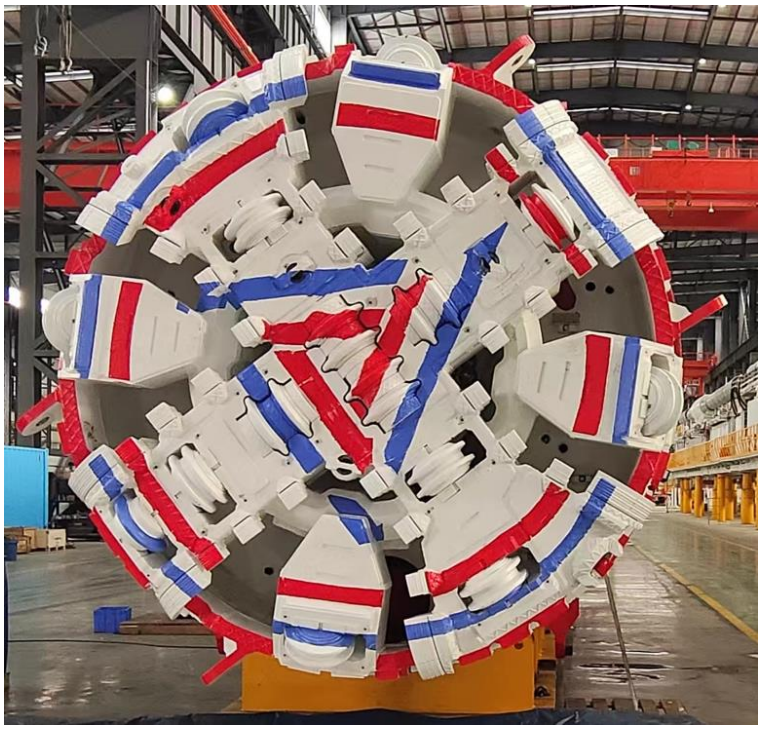
Vasily Anishchenko +1 847 997 39 17 or

Dallas Rush + 731 267 3963 or

Thomas Edelmann +43 664 881 43 724

Vasily Anishchenko

Executive Director of SMP Engineering, USA



1. Equipment Specification

1.03	**Main geological conditions**	**Mixed ground, Clay, sand,boulders, in permafrost (-7°C)underneath river**	
1.04	Segment dimension (OD*ID-width*Split)	Φ3000/Φ3400-1200-universal	mm
1.05	Min. curve radius	150	m
2.00	**TBM General Overview**		
2.02	Excavation diameter	Φ3660	mm
2.03	Cutterhead rotation speed	0~1.9~4.8	rpm
2.04	Max. advance speed	80	mm/min
2.05	Max. thrust	14287@35Mpa	kN
2.06	Total length	95	m
2.07	Shield length	9.971	m
2.08	Total weight (TBM plus backup)	350	t
2.09	Segment dimension(OD*ID-width*Split)	Φ3000/Φ3400-1200-universal	mm
2.10	Operating pressure	3	bar
2.11	Installed power	855.7	kW
2.12	Horizontal curve radius	150	m
2.13	Vertical climbing ability	- 5°/+ 5°	°
2.14	Estimated heaviest transported component weight	Approx. 80	t
3.00	**Cutterhead**		
3.01	Cutterhead specification (Diameter*length)	Φ3660×1472	mm
3.02	Rotation direction	CW/CCW	
3.03	Opening ratio	approx.24	%
3.04	Total weight of structure	approx.28	t
3.05	Structural steel specification	Q355D	
3.06	Qty. of foam port	3	pcs
3.07	Qty. of bentonite port	1	pcs
3.08	Qty. of wear detector	4	pcs
3.09	Qty. of active mixing arm	4	pcs
3.10	**Cutting Tools**		
3.11	**central twin disc cutter**		
3.12	Quantity	8	pcs
3.13	Height	140	mm
3.14	**double disc cutter 14"**		
3.15	Quantity	10	piece
3.16	Height	140	mm
3.17	**single disc cutter 14"**		
3.18	Quantity	1	piece
3.19	Height	140	mm
3.20	**Scraper**		
3.21	Quantity	32	piece
3.22	Height	110	mm
3.23	**Gauge scraper 1**		
3.24	Quantity	8 (2pcs in each group)	groups
3.25	Height	110	mm
3.26	**Outter ring protection**		
3.27	Type of outter ring protection	Alloy protection block+Hardox 500	

3.28	**Copycutter**		
3.29	Quantity	1	piece
3.30	Stroke	20	mm
3.31	Cutter wear detection	4	
4.00	**Central rotary joint**		
4.01	Qty. of foam channel	3	pcs
4.02	Qty. of central water channel	1	pcs
4.03	Qty. of bentonite channel	1	pcs
4.04	Qty. of hydraulic channel	4	pcs
4.05	Qty. of encoder	1	pcs
5.00	**Main drive**		
5.01	Drive type	Electrical drive	
5.02	Qty. of drive motors	4	group
5.03	Total power of drive	380	kW
5.04	Range of rotation speed	0~1.9~4.8	rpm
5.05	Rated rotation speed	1.9	rpm
5.06	Rated torque	1800	kN.m
5.07	Breakout torque	2160	kN.m
5.08	Main bearing diameter	Φ1620	mm
5.09	Main bearing life	>10000	h
5.10	Seal type	Polyurethane	
5.11	Qty. of inner lip seal	2	row
5.12	Qty. of outer Polyurethane seal	2 finger seal+1 VD seal	row
5.13	Torque Limiting Device	yes	
6.00	**Shield body**		
6.01	Type	Active& passive articulation	
6.02	Inclinometer	1	pcs
6.03	Front shield (diameter*length)	Φ3630× 3890(anti-wearing layer not included）	mm
6.04	Weight of front shield	Approx. 30	t
6.05	Qty. of passive mixing arms	2	pcs
6.06	Qty. of front shield lubrication injection ports	6	pcs
6.07	Qty. of pressure sensors on bulkhead	2	pcs
6.08	Qty. temperatur sensors, Bulkhead/ front shield	1+1	pcs
6.09	Qty. of foam port on bulkhead	2	pcs
6.10	Qty. of water/Bentonit port on bulkhead	2	pcs
6.11	Qty. of probe drilling port on the bulkhead	2	pcs
6.12	Middle shield（diameter x length）	Φ3620×3205	mm
6.13	Qty. of middle shield lubrication injection ports	6	pcs
6.14	Inclined probe holes around the shield	6	piece
6.15	Articulation sealing system	2 pcs finger seal+1 pcs rubber seal	
6.16	Weight of middle shield	Approx. 30	t
6.17	Tail shield（diameter x length）	Φ3610×3875	mm
6.18	Weight of tail shield	Approx. 28	t
6.19	Qty of tail shield lubrication injection holes	6	pcs
6.20	Rows of tailskin seal brushes	3	row
6.21	Tailshield grouting excluder	1	row
6.22	Tailskin installation clearance	30	mm

6.23	Qty of grouting injection pipe	2+2	piece
6.24	Qty of grease pipe	4x2	piece
6.25	Material of shield structure	Q355D	
7.00	**Man Lock**		
7.01	Quantity	1	
7.02	Type	Integrate within shield	
7.03	Capacity of chamber	3	pcs
7.04	Operating pressure	4	Bar
7.05	Design pressure	4.4	Bar
7.06	Transporting rail	1	pcs
7.07	Oxygen breathing of personnel locks	1	set
8.00	**Screw Conveyer**		
8.01	Type	shaft	
8.02	Specification (diameter*length)	Ø500×12127	mm
8.03	Max size of particle	ϕ160×360	mm
8.04	Max discharging capability	170	m^3/h
8.05	Driving type	Rear central drive	
8.06	Qty. of driving groups	1	pcs
8.07	Driving power	90	kW
8.08	Max torque	90	kNm
8.09	Range of rotation speed	0-25	r/min
8.10	Rotation direction	CW/CCW	
8.11	Qty. of gates	1+1	row
8.12	Qty. of injection port for muck conditioning	2	pcs
8.13	Qty. of inspection window left &Right	5	nos
8.14	Qty. of pressure sensor	2	pcs
8.15	Qty. of connectors of pressure resistance pump	1	pcs
8.16	Range of extension and retraction (telescop)	500	mm
8.17	Total weight	20	t
9.00	**Segment Erector**		
9.01	Type	Double beam central rotary	
9.02	Pick up method	Mechanical type	
9.03	Qty. of drive motors	1	pcs
9.04	Drive power	37	kW
9.05	Range speed	0～2	rpm
9.06	Axial traveling range	1500	mm
9.07	Degrees of freedom	6	pcs
9.08	Rotation angle	±200	°
9.09	Torque of motor	110	kN.m
9.10	Qty. of rotary encoder	1	set
9.11	Total weight	APP.10	t
9.12	Control method	wireless (with connection point for wired connection)	
10.00	**Segment Crane**		
10.01	Type	Double beams+single beam	
10.02	Drive type	Electrical	
10.03	Pick up method	Mechanical gripping	
10.04	Lifting weight	3+2*2	t
10.05	Lifting power	1.7+2*1.7	kW
10.06	Lifting speed	4/1	m/min
10.07	Horizontal travel speed	10	m/min
10.08	Horizontal travel power	1.1×2	kW

10.09	Control method	remote control + wire control (handle)	
11.00	**Gantry**		
11.01	Safe passage arrangement type	internal	
11.02	Clearance dimensions	1380*1820	mm
11.03	Wheels arrangement	Steel wheel	
11.04	Qty. of gantries	12	pcs
11.05	Qty. of connection bridge	1	pcs
11.06	Quick unloading system	1	set
12.00	**Thrust System**		
12.01	Cylinder specification (Bore diameter / Rod diameter)	Φ200/160	mm
12.02	Cylinder stroke	2000	mm
12.03	Max. thrust speed	80	mm/min
12.04	Qty. of cylinder	13	pcs
12.05	Qty. of cylinder with stroke sensor	4	pcs
12.06	Grouping type	3+3+3+4	
12.07	Max. working pressure	35	MPa
12.08	Max. thrust	14287@35Mpa	kN
13.00	**Articulation System**		
13.01	Cylinder specification (Bore diameter / Rod diameter)of active articulation system	Φ235/170	mm
13.02	Cylinder stroke	160	mm
13.03	Qty. of cylinder	8	pcs
13.04	Qty. of cylinder with stroke sensor	4	pcs
13.05	Max. working pressure	35	MPa
13.06	Max. thrust	12138@35Mpa	kN
13.07	Cylinder specification (Bore diameter / Rod diameter)of passive articulation system	Φ180/80	mm
13.08	Cylinder stroke	150	mm
13.09	Qty. of cylinder	8	pcs
13.10	Qty. of cylinder with stroke sensor	4	pcs
13.11	Max. working pressure	35	MPa
13.12	Max. pull force	5720 @35Mpa	kN
14.00	**Backup Towing Cylinders**		
14.01	Cylinder specs.	Φ130×70-250	mm
14.02	Qty. of cylinders	2	pcs
15.00	**Grouting system**		
15.01	Motar injection pump type	Piston pump	
15.02	Qty of Motar injection pump	1	pcs
15.03	Power of Motar injection pump	30	kw
15.04	Motar injection Capacity	12	m^3/h
15.05	Qty. of Motar grouting hole	2+2	pcs
15.06	Motar storage tank capacity	3	m^3
15.07	Motar tank agitator power	4	KW
16.00	**Foam Injection System**		
16.01	Power of original foam pump	0.75	kW
16.02	Qty. of original foam pump	1	piece
16.03	Output volume of original foam pump	5-300	L/min
16.04	Qty. of foam pump	1	pcs
16.05	Foiam pump power	7.5	kW
16.06	Injection capability	10	m3/min
17.00	**Industrial Compressed Air Systems**		

17.01	Air compressor type	Screw air compressor	
17.02	Qty. air compressor	2	pcs
17.03	Air compressor power(each)	18.5	kW
17.04	Supply air pressure	8	Bar
17.05	Air compressor capacity	3	m^3/min
17.06	Filter	A, B two stage filtration	
18.00	**Pressure Resisting Air System**		
18.01	Type of pressure resisting system	SAMSON	
18.02	Activated carbon filter	2	
18.03	Control type	PI control	
19.00	**Industrial Water Supply and Cooling System**		
19.01	Water supply from site - required quantity	20	m3/h
19.02	Water supply - required pressure	4~8	Bar
19.03	Water supply - rated temperature	<28	℃
19.04	Pipe diameter	DN 50	mm
19.05	Qty. of water hose telescopic device	1	pcs
19.06	Hose length on reel	15	m
19.07	Type of cooling system	inner and outer circulation	
19.08	Circulating cooling water pump type	centrifugal pump	
19.09	Circulating cooling water pump power	5.5	kW
19.10	Booster water pump power	7.5	kW
20.00	**Gear Oil System**		
20.01	Pump type	screw pump	
20.02	Pump power	1.5	kW
20.03	Pump pressure	6～20	Bar
21.00	**Tailskin Grease System**		
21.01	Tail grease pump type	pneumatic ram pump	
21.02	Qty. of pump	2	pcs
21.03	Pump capacity	4.2	L/min
21.04	Pump pressure	350	Bar
21.05	Grease barrels size	70	kg
22.00	**Main Drive Sealing System**		
22.01	Type of grease system	multi line	
22.02	Qty. of pump	1	pcs
22.03	Type of main drive grease system	pneumatic ram pump	
22.04	Main drive grease system capacity	4.2	L/min
22.05	Main drive grease system pressure	350	Bar
22.06	Grease barrels size	55	kg
23.00	**Dewatering System**		
23.01	Type of pumps	Pneumatic diaphragm pump	
23.02	Number of pumps	2	No
23.03	Pumps capacity	18	m^3/h
23.04	Sewage tank apacity	1	m3
23.05	Sewage tank dewatering pump	30	l/sec
24.00	**Ventilation System**		
24.01	Tunnel flexible duct diameter	Φ600	mm
24.02	Ventilation duct cassette	2	unit
24.03	Ventilation duct cassette capacity	100	m
24.04	Secondary back-up ventilation lines diameter	Φ400	mm
24.05	Back-up booster fans power	2×7.5	kW
24.06	Duct Cassette lifting system	yes	yes/no
25.00	**Electrical System**		

25.01	Primary voltage	10	kV
25.02	Secondary voltage	400	V
25.03	Drive voltage	400	V
25.04	Lighting voltage	220	V
25.05	Valve control voltage	24	V
25.06	Power factor correction	≮0.9	
25.07	Transformer type	Silicon liquid submerged	
25.08	Transformer capacity	1000	kVA
25.09	Qty.of transformers	1	pcs
25.10	Frequency	50	Hz
25.11	Qty. of cable box	1 in use +1 for spare	pcs
25.12	Cable Box capacity	150	m
25.13	High voltage cable cross-section	3×35+3×25/3	mm^2
26.00	**Belt conveyor**		
26.01	Drive power	22	kW
26.02	Belt speed	0~2.5	m/s
26.03	Capacity of belt conveyor	200	m3/h
26.04	Belt width	600	mm
26.05	Belt length	Appr.125	m
26.06	Pulling wire switch	2	Set
26.07	Belt off-tracking device	4	pcs
26.08	Scrapper	1 PE scrapper+1 alloy scrapper+1 set cleaner	pcs
26.09	Cleaning device	1 water cleaner	pcs
27.00	**Guidance System**		
27.01	Brand	CREG	
27.02	Accuracy	2	s
28.00	**Monitoring System**		
28.01	Qty. of monitoring system	1	set
29.00	**Communication System**		
29.01	Qty. of communication system	1	set
30.00	**Lighting System**		
30.01	Lighting specifications	2×9w	w
30.02	Qty. of lights	1	set
30.03	Emergency lighting specifications	2×9w	w
30.04	Qty. of emergency lighting	1	set
31.00	**Fire Extinguishing System**		
31.01	Type of portable fire extinguisher	CO2	
31.02	Qty of portable fire extinguisher	8	set
31.03	Type of portable fire extinguisher	Dry powder	
31.04	Qty of portable fire extinguisher	8	set
32.00	**Harmful Gas Monitoring System**		
32.01	Type of monitoring sensor	fixed	
32.02	Qty. of monitoring sensor	5	pcs
32.03	Type of monitoring gas	CO2/CO/H2S/CH4/NO	
33.00	**Probe drilling system**		
33.01	Probe drill	1	set

We can provide detailed drawings of the shield at a special request. The schematics can be found bellow:

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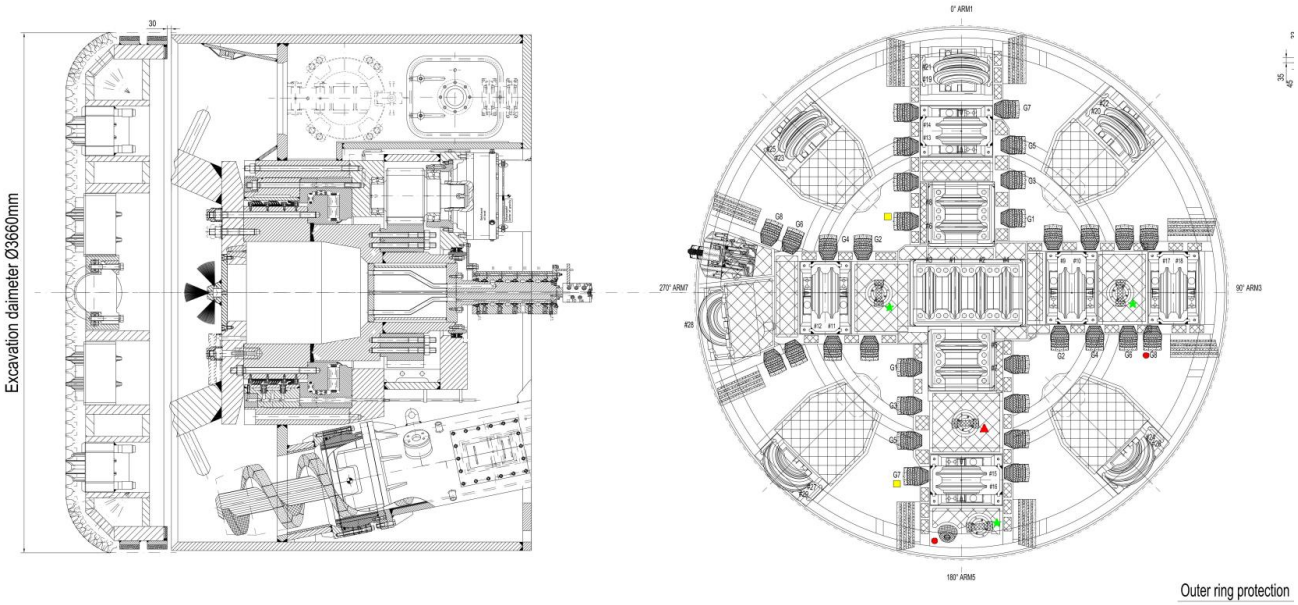
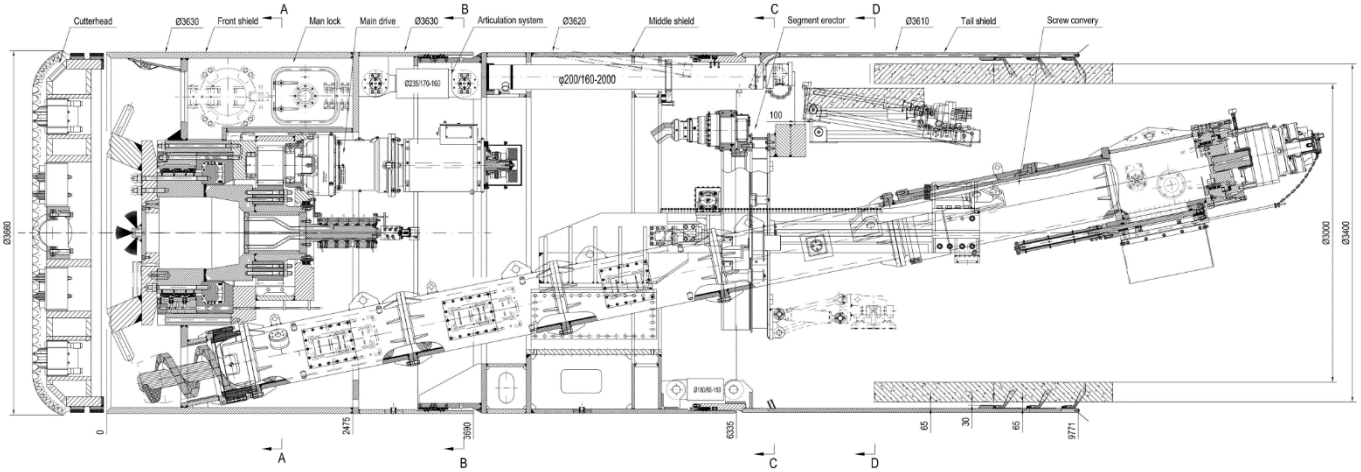
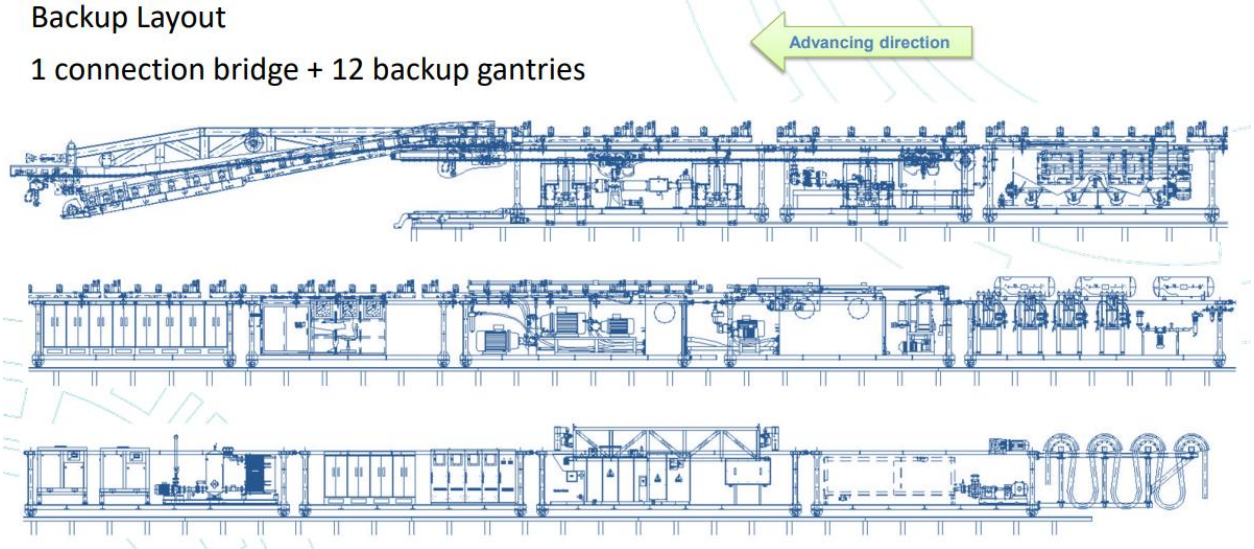


Outer ring protection



Backup Layout

1 connection bridge + 12 backup gantries



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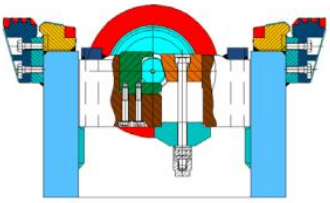
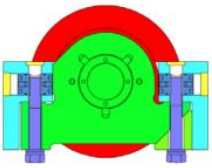
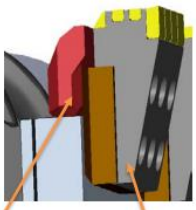
Cutter features



Face Disc Cutter

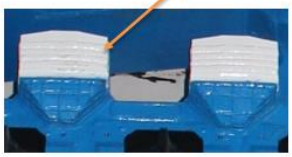


Center Disc cutter

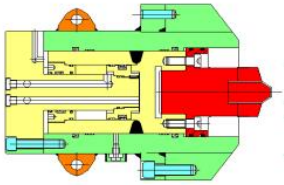


Protection block

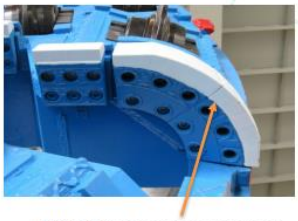
Face Scraper



Scraper:



Copy cutter



Split type gauge scraper
(two pieces)

Equipment photos:

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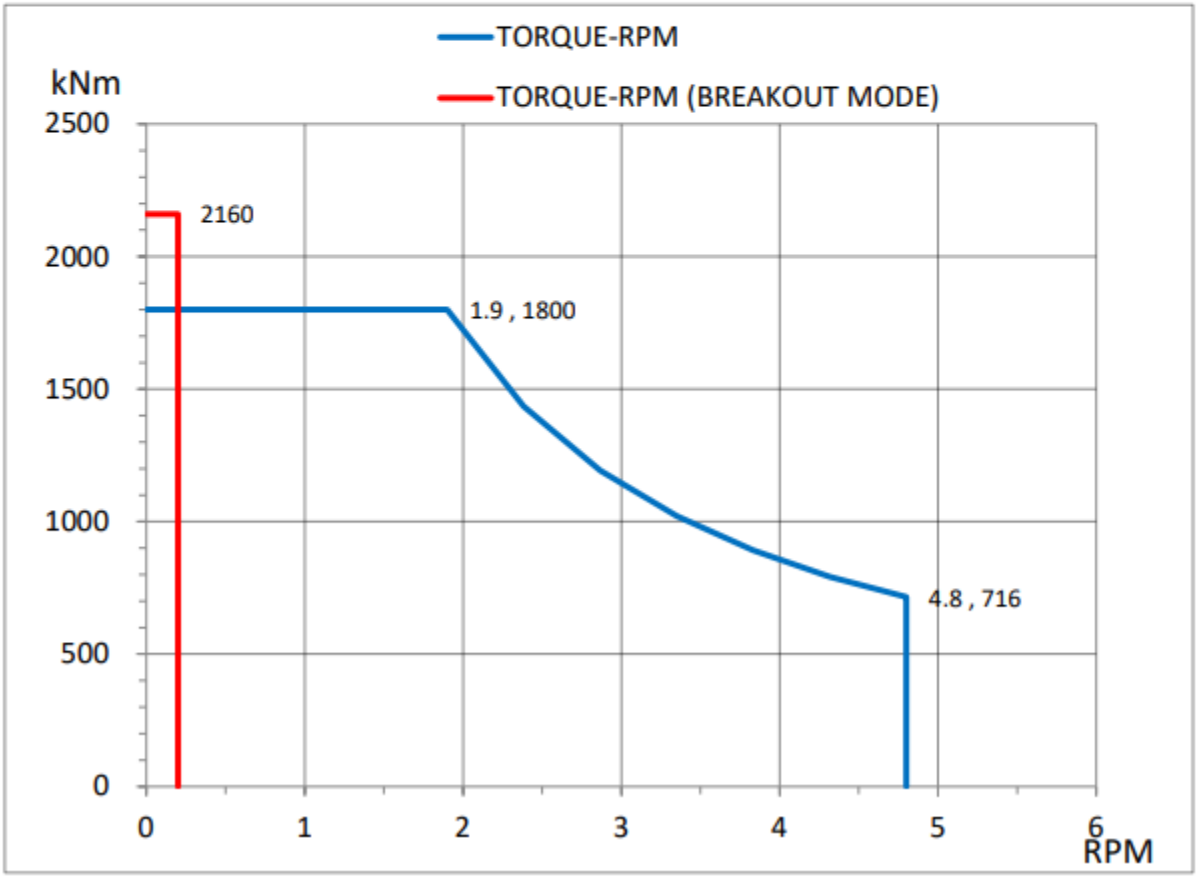
TBM TORQUE-ROTARION SPEED CURVE

Drive power	4	×	95	=	380	kW
Rotation speed	0	~	1.9	~	4.8	rpm
Rated torque			1800			kNm
Breakout torque			2160			kNm



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Price offer

#	Item of Brand New Equipment	Qty	Price, Euros	Price, US Dollars
1	New Tunnel boring machine	1	4,300,065.00	5,160,078.00
2	PPS guidance system	1	206,626.50	247,951.80
3	PPS Ring Building software	1	20,300.00	24,360.00
4	Installed set of cutting tools (14 inch discs)	1	107,000.00	128,400.00
5	Special tools set	1	40,000.00	48,000.00
6	Camera system front shield	1	33,600.00	40,320.00
7	Segment quick unloading equipment	1	72,598.00	87,117.60
8	Additional thermal sensor shield-bulkhead	1	29,000.00	34,800.00
9	Cooling tower (EWK)	1	110,000.00	132,000.00
10	E-Locomotive (30 t)	2	498,600.00	598,320.00
11	Quick Charging stations	2	62,000.00	74,400.00
12	Muck cars	8	228,000.00	273,600.00
13	Segment Cars	4	81,200.00	97,440.00
14	Flat car	2	21,800.00	26,160.00
15	Mortar car	2	54,000.00	64,800.00
16	Mortar Transfer Pump	1	36,000.00	43,200.00
17	Man Rider	2	43,000.00	51,600.00
18	Set of Segment Molds	4	328,500.00	394,200.00
19	Spare parts set	1	250,000.00	300,000.00
	Total		**6,522,289.50**	**7,826,747.40**

NOTE: All equipment is brand new and in stock. Delivery in 1 week after downpayment!