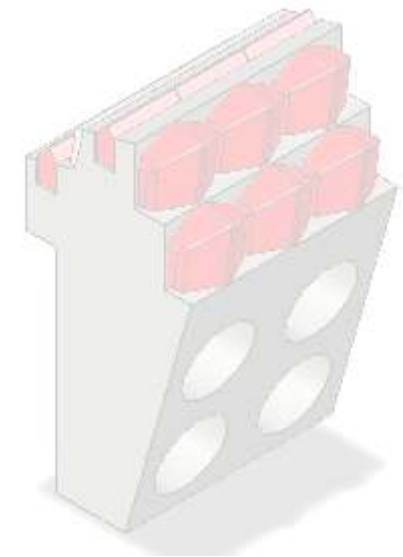


TunnelTec Tools



.... stands for perfect fit and high quality in materials and manufacture

Jobsite Presentation



TunnelTec Tools



Overview TBMs with TunnelTec Tools

| Jobsite | Herrenknecht | Lovat | NFM | Wirth | Others |
|-------------|--------------|--------------------------|--------------------|-------|--------|
| Bologna | | X X Emilia – Felsinea | | | |
| Brescia | X | | | | |
| Caracas | | X Betania | | | |
| Castellanza | | | | X | |
| Kazan | | | X | | |
| Madrid L1&4 | X | | | | |
| Madrid L3 | X Guster | | X La Adelantada | | |
| Milano | | X Pozzo Pisacane | | | |
| Seville | | X La Giralda | | | |
| Wuhan | | | X X | | |
| | | | | | |
| | | | | | |
| | | | | | |

TunnelTec Tools



Jobsite: Bologna (Italy) 1



Country: Italy
City: Bologna
Customer: San Ruffillo s.c.r.l. (Ghella, Nesco, Salini)
Project Type: Highspeed Railway
Geology: Mainly clay, sand and gravel
TBM Type: EPB (2x Lovat)
Diameter: 9.40 meter
Used TunnelTec Tools: Nose Cone / Face Ripper
Gauge Ripper



TunnelTec Tools



Jobsite: Brescia (Italy) 1



Country: Italy
City: Brescia
Customer: Metrobus Brescia (Astaldi)
Project Type: Metro
Geology: Mainly sand and gravel with cobbles
TBM Type: EPB (Herrenknecht)
Diameter: 9.18 meter
Used TunnelTec Tools: Face Scraper
Bucket Scraper
Weld-On Ripper
Ripper for Cutter Replacement
Nose Cone Ripper



TunnelTec Tools



Jobsite: Caracas Metro Linea 3 (1)



| | |
|-----------------------|---------------------------|
| Country: | Venezuela |
| City: | Caracas |
| Customer: | Ghella Sogene CA |
| Project Type: | Metro |
| Geology: | fluvial and alluvial soil |
| TBM Type: | EPB (Lovat) |
| Diameter: | 5.83 meter |
| Used TunnelTec Tools: | Face Ripper |



TunnelTec Tools



Jobsite: Castellanza (Italy) 1



Country: Italy
City: Castellanza
Customer: Castellanza S.C.A.R.L.
(Romagnoli, Strabag, Torno)
Project Type: Metro
Geology: Mainly sand, gravel and big boulders
TBM Type: EPB (Wirth)
Diameter: 8.16 meter
Used TunnelTec Tools:

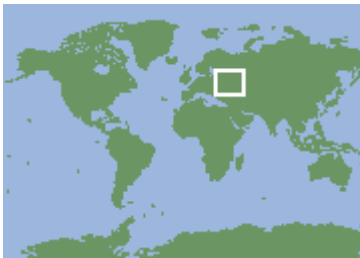
- Nose Cone Ripper
- Adapter Boxes
- Face Ripper
- Bucket Scraper
- Gauge Ripper
- Additional Gauge Ripper
- Cutter with TC Bullets



TunnelTec Tools



Jobsite: Kazan Metro 1



Country: Russia
City: Kazan
Customer: NFM Technologies
Project Type: Metro
Geology: Clay-dolomite, Cemented Sandstone, gravel
TBM Type: EPB (NFM)
Diameter: 5.89 meter
Used TunnelTec Tools: Face Scraper
Bucket Scraper with added Ripper
Nose Cone Plate



TunnelTec Tools



Jobsite: Madrid Metro Linea 3 (Spain) 1



| | |
|-----------------------|--------------------|
| Country: | Spain |
| City: | Madrid |
| Customer: | FCC |
| Project Type: | Metro |
| Geology: | Sand and Gypsum |
| TBM Type: | EPB (Herrenknecht) |
| Diameter: | 9.43 meter |
| Used TunnelTec Tools: | Face Scraper |



TunnelTec Tools



Jobsite: Madrid Metro Linea 3 (Spain) 2



| | |
|-----------------------|--------------------------------|
| Country: | Spain |
| City: | Madrid |
| Customer: | FCC |
| Project Type: | Metro |
| Geology: | Sand and Gypsum |
| TBM Type: | EPB (NFM) |
| Diameter: | 9.43 meter |
| Used TunnelTec Tools: | Face Scraper Bucket Scraper |



TunnelTec Tools



Jobsite: Madrid Metro Linea 1&4 (Spain) 1



| | |
|-----------------------|--|
| Country: | Spain |
| City: | Madrid |
| Customer: | Sacyr |
| Project Type: | Metro |
| Geology: | Mainly abrasive sand |
| TBM Type: | EPB (Herrenknecht) |
| Diameter: | 8.94 meter |
| Used TunnelTec Tools: | Face Scraper Special Bucket Protection Ripper |



TunnelTec Tools



Jobsite: Milano (Italy) 1



Country: Italy
City: Milano
Customer: Metrofiera S.C.A.R.L. (Iclet, Maire, Torno)
Project Type: Metro
Geology: Alluvium with gravel
TBM Type: EPB (Lovat)
Diameter: 6.57 meter
Used TunnelTec Tools: Nose Cone
Nose Cone Extensions
Bucket Scraper
Gauge Ripper
Face Ripper
Special Gauge Ripper



TunnelTec Tools



Jobsite: Seville (Spain) 1



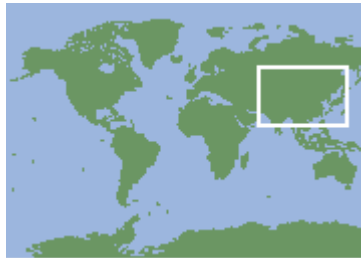
Country: Spain
City: Seville
Customer: UTE Metro de Sevilla
(Dragados, GEA21, RuS, Sacyr)
Project Type: Metro
Geology: Gravel and sandy gravel
TBM Type: EPB (Lovat)
Diameter: 6.10 meter
Used TunnelTec Tools: Face Ripper



TunnelTec Tools



Jobsite: Yangtze River Crossing 1



| | |
|-----------------------|---|
| Country: | China |
| City: | Wuhan |
| Customer: | China Railway Tunnel Group (CRTG) |
| Project Type: | Highway and Subway tunnel |
| Geology: | Silt and sand with clay and huge boulders |
| TBM Type: | Slurry (2x NFM) |
| Diameter: | 11.38 meter |
| Used TunnelTec Tools: | Bucket Scraper Face Scraper |



Summary

The advantages of TunnelTec tools are:

- combined cutting and scraping ability in geology with compression strength up to 45 MPa
- optimized wear conduct due to project-orientated engineering
- usable on all cutting wheels without modification
- reduced tool changing
- less down time of the TBM
- increased daily headway of the TBM
- reduction of needed torque
- improved cutting performance in mixed geology
- improvement of material flow of excavated material

TunnelTec Tools



We thank you for the interest in our products.

TunnelTec
your partner for perfect designed tunnelling tools.