

# TERRA-HAMMER Steel Pipe Ramming Systems

Swiss made





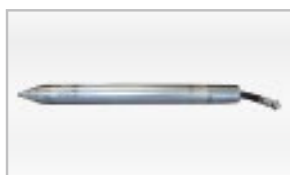






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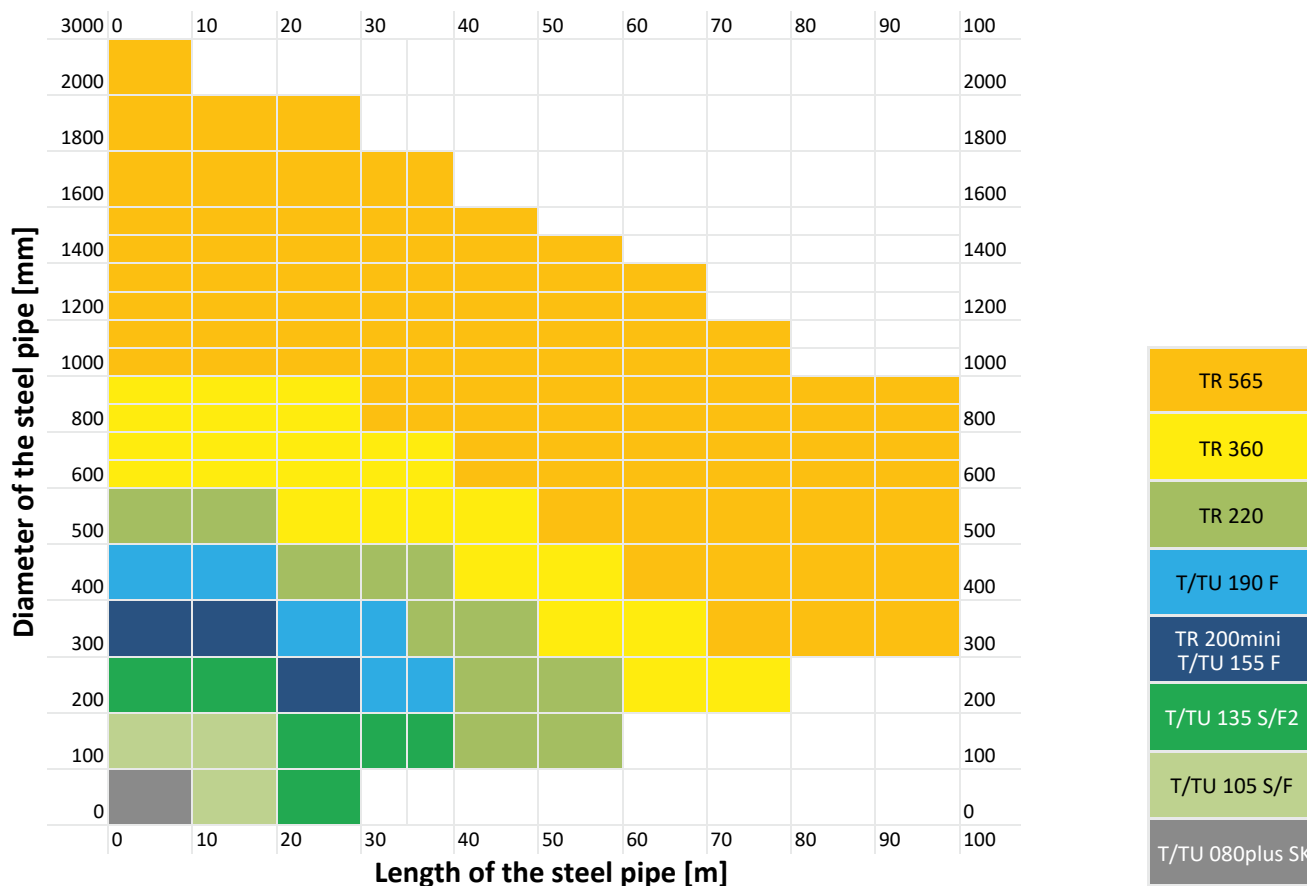
Full listing of available TERRA-Rams

# Selection of TERRA-Ram

## Ramming diagram

### Ramming diagram

The size selection of the TERRA-Ram depends on the diameter of the steel pipe, also the total length of the ramming job. The chart below can be used to select the most suitable size of TERRA-Ram<sup>1)</sup>



TERRA-HAMMER Steel Pipe Ram	Diameter [mm]	Steel Pipe [mm]	Length [m]	Weight [kg]	Impact [to]	Frequency [1/min]	Air Cons. [m³/min]	Pressure [bar]
T/TU 080plus SK	Ø 80	25 - 100	1.37	37	34	395	1.80	6 - 7
T/TU 105 S/F	Ø 105	25 - 200	1.40	60	57	360	2.40	6 - 7
T/TU 135 S/F2	Ø 135	100 - 300	1.70	125	140	350	2.40	6 - 7
T/TU 155 F	Ø 155	150 - 400	1.84	170	165	285	3.8	6 - 7
T/TU 190 F	Ø 190	200 - 500	1.89	258	245	275	5	6 - 7
TR 200mini	Ø 200	150 - 400	0.90	112	155	550	4	6 - 7
TR 220	Ø 220	100 - 600	1.60	315	370	320	7	6 - 7
TR 360	Ø 360	200 - 1'000	1.75	663	840	280	12	6 - 7
TR 565	Ø 565	400 - 3'000	2.30	2'535	2'400	195	34	6 - 7

Technical specifications can be changed without prior notice.

T = TERRA Piercing Tool for Steel Pipe Ramming, TR = TERRA-Ram for Steel Pipe Ramming

<sup>1)</sup> This chart can be used if ramming through medium strength ground. When ramming through much softer or harder ground a smaller or larger TERRA-Ram may be required. The above diagram is valid only for medium strength ground. TERRA cannot be held liable for any unsuccessful ramming job which was assumed possible based on the chart above, it is offered as a guide only.

### Revolutionary Swiss Engineering

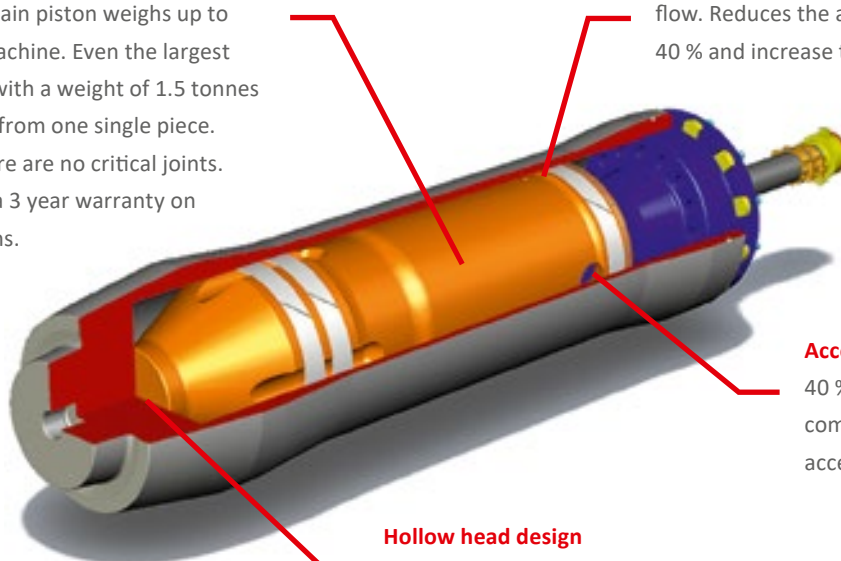
The steel pipe rams of TERRA are amongst the fastest and most powerful rams available on the world market. TERRA-Ram's enormous ramming force and low air requirement shows our Swiss engineers have proven their talent in the art of engineering. Due to the hollow head design the interior of the ram is optimised to produce the highest impact. A true masterpiece of Swiss Engineering.

#### Heavy main piston - High Impulse

The heavy main pistons (strikers) produce the unusual high impact and ramming energy. The main piston weighs up to 60 % of the machine. Even the largest main pistons with a weight of 1.5 tonnes are produced from one single piece. Therefore there are no critical joints. TERRA offers a 3 year warranty on all main pistons.

#### Optimised air flow

Less recoil due to the aerodynamic air flow. Reduces the air consumption by 40 % and increase the impact by 25 %.



#### Acceleration ports

40 % less compressed air than competitive rams due to acceleration ports.

#### Hollow head design

The hollow head design allows 25 % heavier main pistons providing high energy and short machine lengths.

### Advantages



#### Heavy main piston:

The main piston weights up to 60% of the total weight.



#### Service friendly design:

It consists of 40% less parts than other rams.



#### Unique hollow head design:

Shorter than competitive rams due to hollow head design.



TERRA offers a **3 year warranty** on their main pistons. The only company in the world to do so.



#### Smart air flow:

Up to 40% less air consumption due to special air flow inside the ram.



#### Different applications:

Horizontal or vertical application. Steel pipes up to 3m can be rammed.

# TERRA-HAMMER Steel Pipe Ramming Systems

## Applications

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### Horizontal application

Steel pipes up to  $\varnothing$  3'000 mm are rammed horizontally through the ground. The ram sits behind the steel pipe. Depending on ground conditions and steel pipe diameter drive lengths up to 120 m are possible.



### Vertical application

Steel pipes up to  $\varnothing$  3'000 mm are rammed vertically into the underground. They are used for foundations of line masts, for foundations and pile foundations, for well constructions, for pier, etc.



### Pipe roofing

The TERRA-ram can also be used in tunnel constructions. It rams several steel pipes parallel to produce a roof.





### HDD assist

When pulling in long steel pipes with HDD drill rigs, the TERRA ram gives dynamic assistance at the rear of the steel pipe. This leads to higher productivity and longer drilling lengths.



### HDD casing

When a HDD drill takes several months there is the risk, that the entry of the drill collapses. In such a case it is useful to ram a steel pipe 30 - 50 m as a protection pipe into the ground.



### HDD rescue

When a HDD drill is jammed, the TERRA ram helps to rescue the rods.



### Steel pipe ramming using the piercing tool

With the TERRA-HAMMER T 155 F and  
T 190 F steel pipes can be rammed  
without any modification to the head.

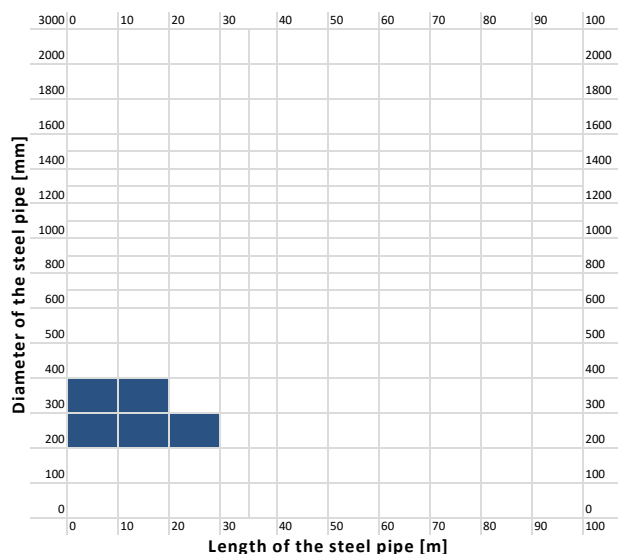




# TERRA-HAMMER T/TU 155 F and T/TU 190 F

Steel Pipe Ramming using the Piercing Tool

## TERRA-HAMMER T/TU 155 F

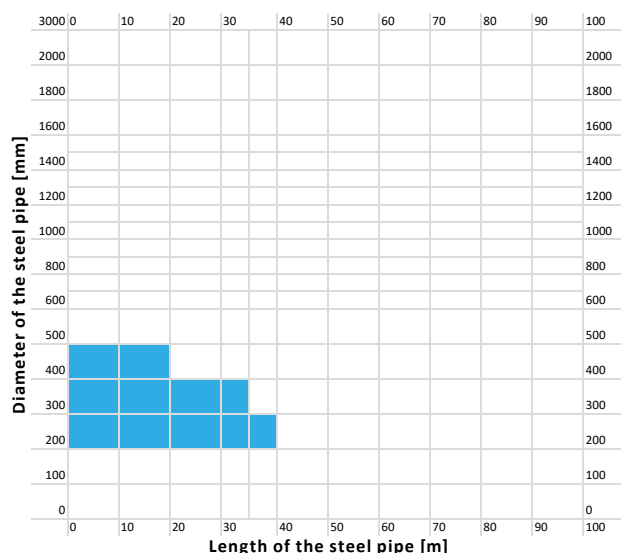


TERRA-HAMMER Steel Pipe Ram	T/TU 155 F
Diameter:	155 mm
Length:	1.84 m
Total weight:	170 kg (100 %)
Main piston weight:	68 kg (40 %)
Frequency:	285 1/min
Air consumption:	3.8 m <sup>3</sup> /min
Pressure:	6-7 bar
Theor. impact energy:	2'450 Nm
Real impact energy:	490 Nm
Ramming energy:	140'000 Nm/min
Ramming force:	165 to



The T/TU 155 F can be used as a piercing tool or as a steel pipe ram. There is no modification required to the piercing tool. Steel pipes Ø 150 - 400 mm can be installed into the ground.

## TERRA-HAMMER T/TU 190 F



TERRA-HAMMER Steel Pipe Ram	T/TU 190 F
Diameter:	190 mm
Length:	1.89 m
Total weight:	258 kg (100 %)
Main piston weight:	95 kg (37 %)
Frequency:	275 1/min
Air consumption:	5.0 m <sup>3</sup> /min
Pressure:	6-7 bar
Theor. impact energy:	2'900 Nm
Real impact energy:	725 Nm
Ramming energy:	200'000 Nm/min
Ramming force:	245 to



The T/TU 190 F is the largest piercing tool which can be used also as a steel pipe ram without modification. Steel pipes Ø 200 - 500 mm can be installed into the ground.

### Vertical application

Steel pipes up to  $\varnothing 3'000$  mm are rammed vertically into the underground. They are used for foundations of line masts, for foundations and pile foundations, for well constructions, for pier, etc.

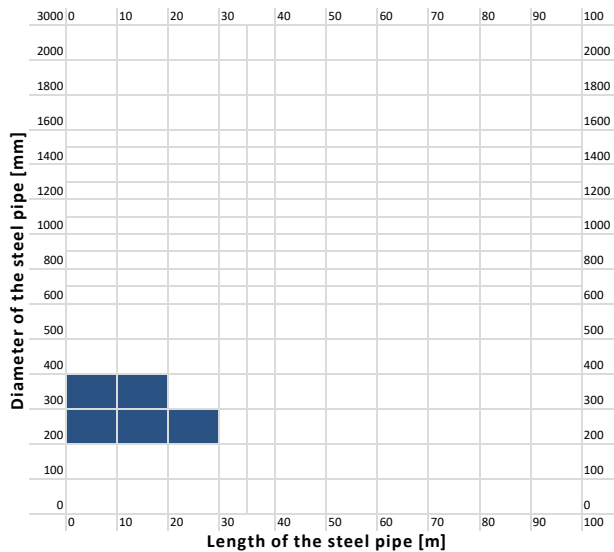




# TERRA-HAMMER TR 200mini and TR 220

Compact Design with High Impact Force

## TERRA-HAMMER TR 200mini

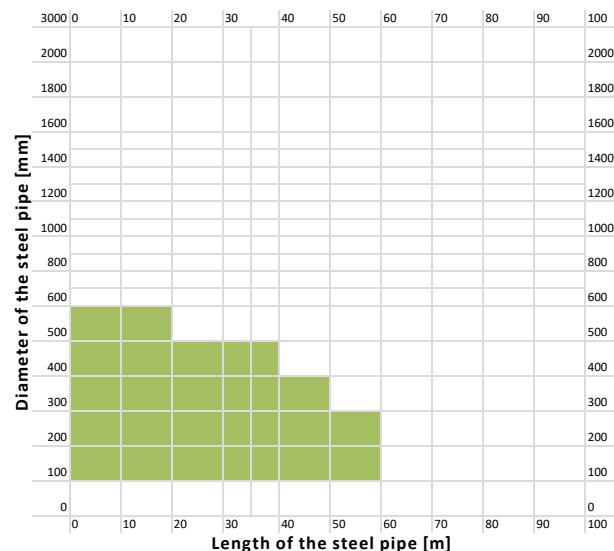


TERRA-HAMMER Steel Pipe Ram	TR 200mini
Diameter:	190/200 mm
Length:	0.90 m
Total weight:	112 kg (100 %)
Main piston weight:	40 kg (36 %)
Frequency:	550 1/min
Air consumption:	4.0 m <sup>3</sup> /min
Pressure:	6-7 bar
Theor. impact energy:	1'800 Nm
Real impact energy:	460 Nm
Ramming energy:	244'000 Nm/min
Ramming force:	155 to



The TR 200mini is one of the shortest steel pipe rams worldwide. Compact design but powerful inside make the TR 200mini to one of the most popular rams. With its short length of only 0.90 m it is the ideal ram for vertical applications.

## TERRA-HAMMER TR 220



TERRA-HAMMER Steel Pipe Ram	TR 220
Diameter:	220 mm
Length:	1.60 m
Total weight:	315 kg (100 %)
Main piston weight:	121 kg (38 %)
Frequency:	320 1/min
Air consumption:	7.0 m <sup>3</sup> /min
Pressure:	6-7 bar
Theor. impact energy:	4'400 Nm
Real impact energy:	1'100 Nm
Ramming energy:	320'000 Nm/min
Ramming force:	370 to



The TR 220 only requires 7 m<sup>3</sup>/min which makes the TR 220 one of the most efficient rams in its class. It requires 40 % less air consumption than competitors rams. Our Swiss engineers have designed a compact machine with a very high impact main piston.

### Horizontal application

Steel pipes up to  $\varnothing 3'000$  mm are rammed horizontally in the underground. The ram sits behind the steel pipe. Depending on ground conditions and steel pipe diameter lengths up to 120 m are possible.

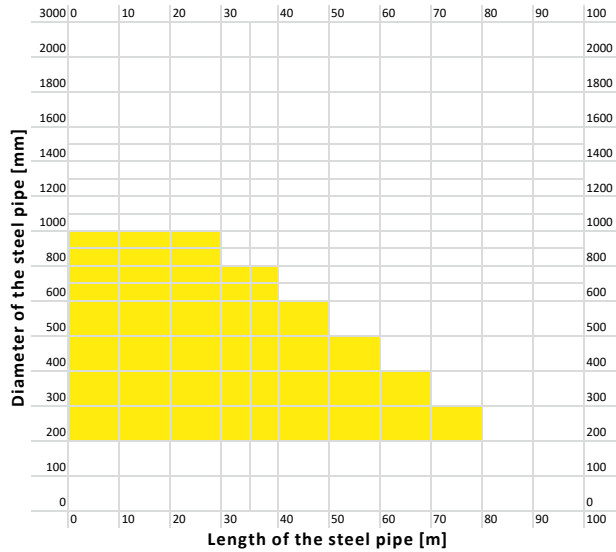




# TERRA-HAMMER TR 360 and TR 565

Steel pipe ramming with the TERRA steel giants

## TERRA-HAMMER TR 360

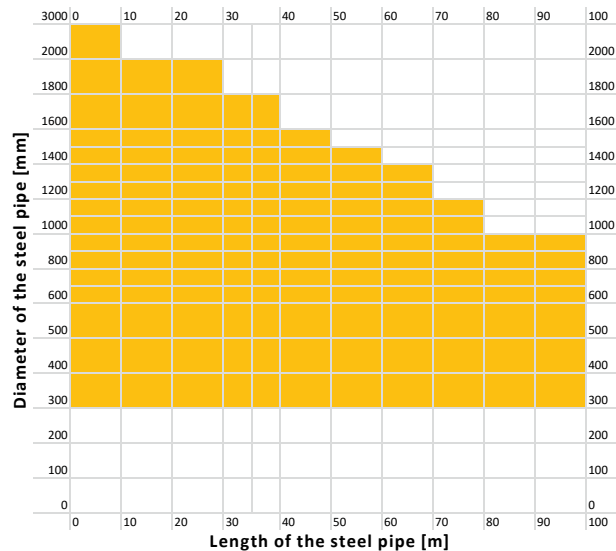


TERRA-HAMMER Steel Pipe Ram	TR 360
Diameter:	360 mm
Length:	1.75 m
Total weight:	663 kg (100 %)
Main piston weight:	352 kg (53 %)
Frequency:	280 1/min
Air consumption:	12 m³/min
Pressure:	6-7 bar
Theor. impact energy:	11'000 Nm
Real impact energy:	2'200 Nm
Ramming energy:	530'000 Nm/min
Ramming force:	840 to



With its compact design the TR 360 is 0.6 m shorter than comparable rams. The TR 360 requires 30 % less air and is stronger at the same time.

## TERRA-HAMMER TR 565



TERRA-HAMMER Steel Pipe Ram	TR 565
Diameter:	565 mm
Length:	2.30 m
Total weight:	2'535 kg (100 %)
Main piston weight:	1'310 kg (52 %)
Frequency:	195 1/min
Air consumption:	34 m³/min
Pressure:	6-7 bar
Theor. impact energy:	48'500 Nm
Real impact energy:	9'700 Nm
Ramming energy:	1'900'000 Nm/min
Ramming force:	2'400 to



The TR 565 is one of the strongest machine in its class. With a length of 2.30 m the ram is 1 m shorter than comparable rams. The machine only needs one compressor with an air requirement of 34 m³/min.





### Support carriage

For correct adjustment of your TERRA-Ram.

Part Number	Description	Models [mm]
1325.1761.00	Support carriage TR 220 + TR 360, height adjustable between 90 - 300 mm	Ø 220/360
0000.1635.00	rotary key 1/2", 250 mm	Ø 220/360
0000.1635.10	nut for SW 30 for rotary key	Ø 220/360
1565.1761.00	Support carriage TR 565, height adjustable between 130 - 755 mm	Ø 565



Support carriage TR 220 + TR 360

### TERRA oiler and special oil

TERRA developed a special oil for its rams. The synthetic HD oil with high viscosity and additives operates down to -25 °C (antifreeze) and ensures a long lifetime of your TERRA-Ram. The oil is biodegradable.

Part Number	Description	Models [mm]
1210.1740.00	TERRA oiler, 9 ltr	Ø 220/200mini
1325.1740.03	TERRA oiler, 9 ltr	Ø 360
1565.1740.00	TERRA oiler, 9 ltr	Ø 565
1540.1749.00	TERRA special oil, can with 10 ltr	
1540.1749.10	TERRA special oil, barrel with 200 ltr	
1540.1749.11	barrel tap for barrel with 200 ltr	



TERRA oiler, 9 ltr



TERRA special oil, can with 10 ltr

### Tensioning accessories

During the launching procedure tensioning accessories for tensioning the TERRA-Ram against the steel pipe are necessary. The chain is used to connect the steel pipe with the ratchet tensioner.

Part Number	Description	Models [mm]
0000.1608.00	Lifting strap, 0.5 to, U = 2.5 m	Ø 155-220
0000.1614.00	Lifting strap, 1.0 to, U = 3.5 m	Ø 360
1510.1608.00	Lifting strap, 3.0 to, U = 5.0 m	Ø 565
1190.1776.00	'S'-hooks, red, 0.75 to	Ø 200mini
1325.1776.00	'S'-hooks, red, 1.5 to	Ø 220/360
1510.1776.00	'S'-Haken, rot, 3.0 to	Ø 565
1510.1777.00	Chain with two eyes, L = 0.7 m	Ø 200-565
1510.1748.00	Ratchet sling TR 360	Ø 220-360
1510.1748.01	Ratchet sling TR 565	Ø 565
1200.1755.00	Pressure ring 200/2x	Ø 200mini
1200.1755.01	Pressure ring 200/5x (vertical)	Ø 200mini
1220.1755.00	Pressure ring 220/2x	Ø 220
1220.1755.01	Pressure ring 220/5x (vertical)	Ø 220
1360.1755.01	Pressure ring 360/2x	Ø 360
1360.1755.05	Pressure ring 360/5x (vertical)	Ø 360



Chain with two eyes



Pressure ring for TR 360, with two eyes



Ratchet sling



S-hook, red

# Ram Rings

## Standard Accessories

### Transfer of the ramming energy

TERRA ram rings transfer the ramming energy of the TERRA-Ram into the steel pipe. All TERRA ram rings have an outer cone and a pipe stop. The outer cone fits the inside of the steel pipe. The pipe stops prevent the ram ring from being over driven. They also prevent "belling" of the steel pipe. The pipe stop transfer 100 % of the ramming energy.



Transfer of the ramming energy

### Preparation of Leading Pipe

The first pipe section to be driven must be specially prepared with a reinforced leading edge to strengthen the front end against the forces imposed on it during ramming and to provide clearance both internally and externally to assist in reducing friction between the steel pipe and surrounding strata.



Leading Pipe

### Ram rings (up to Ø 355 mm)

#### Individual Ram Rings

With inner pipe diameters up to 355 mm individual ram rings are used. Individual ram rings fit exactly to one corresponding steel pipe size.



Individual Ram Ring

#### Ram Rings for smaller diameters

If the steel pipe is smaller than the ram itself, the ramming energy is transferred by a special ram ring.

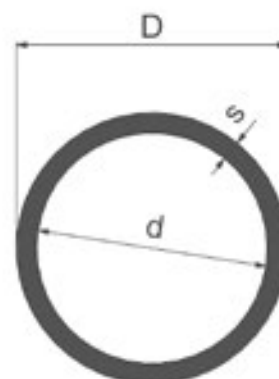


Ram Ring for smaller diameters

### Please tell us:

- Outer Diameter (D), thickness (s) and Inner Diameter (d) of the steel pipe
- Model and serial number of your TERRA-Ram

We will offer you the most suitable ram ring.





### Lock-in system (from Ø 365 mm)

For steel pipes with an inner diameter of 365 mm and above, the TERRA lock-in system is used. The TERRA lock-in system consists of different ram rings each designed to interlock.



TERRA lock-in system

Part Number	Description	suitable on [mm]	for steel pipes [mm]
0025.1170.03	Ram Ring 365-395 mm	RR 300-312 / TR 360 / TR 565	365-395
0025.1172.00	Ram Ring 415-445 mm	RR 365-395	415-445
0025.1174.03	Ram Ring 465-495 mm	RR 365-395	465-495
0025.1176.03	Ram Ring 570-600 mm	RR 465-495 / TR 565	570-600
0025.1178.03	Ram Ring 670-700 mm	RR 570-600	670-700
0025.1179.03	Ram Ring 720-750 mm	RR 570-600	720-750
0025.1180.03	Ram Ring 770-800 mm	RR 670-700	770-800
0025.1181.03	Ram Ring 865-905 mm	RR 770-800	865-905
0025.1182.03	Ram Ring 965-1005 mm	RR 770-800	965-1005
0025.1184.03	Ram Ring 1165-1205 mm	RR 965-1005 RP 360/965-1005, RP 565/965-1005	1165-1205
0025.1186.03	Ram Ring 1365-1405 mm	RR 1165-1205	1365-1405
0025.1188.03	Ram Ring 1465-1505 mm	RR 1365-1405	1465-1505
0025.1189.00	Ram Ring 1465-1505 mm	RR 965-1005	1465-1505
0025.1192.00	Ram Ring 1765-1805 mm	RR 1465-1505	1765-1805
0025.1194.00	Ram Ring 1965-2005 mm	RP 1765-1805	1965-2005

TR = TERRA-Ram, RR = Ram Ring, RP = Ram Plate

### Ram plates (from Ø 800 mm)

Special ram plates are offered for pipe diameters from Ø 800 mm. Ram plates are a lot lighter than the corresponding lock-in system. The openings in between its arms allow spoil access at the back end of the steel pipe during the ramming procedure. Ram plates can be combined with larger lock-in ram rings.



Ram Plate 565/Ø1800  
onto Ram Ring 1965-2005

Part Number	Description	suitable on [mm]	for steel pipes [mm]
1360.1182.00	Ram Plate 360/965-1005	TR 360	965-1005
1565.1178.00	Ram Plate 565/865-905	TR 565	865-905
1565.1182.00	Ram Plate 565/965-1005	TR 565	965-1005
1565.1184.00	Ram Plate 565/1165-1205	TR 565	1165-1205
1565.1188.00	Ram Plate 565/1565-1605	TR 565	1565-1605
1565.1194.00	Ram Plate 565/Ø1800	TR 565	suitable on RR 1965-2005

TR = TERRA-Ram, RP = Ram Plate

# Wear and Spare Parts

## Service Accessories

### Spoil access adapter

The openings in between the ram plate and the spoil access adapter allow spoil access at the back end of the steel pipe during the ramming procedure.

Part Number	Description	ID [mm]	Models [mm]
0028.1157.01	Spoil access ad.	RR 135/xxx-yyy	T/TU 135 F2
0028.1157.00	Spoil access ad.	ID 149-154	T/TU 135 F2
0028.1160.01	Spoil access ad.	ID 200-210 RR 220/xxx-yyy	TR 220
0028.1166.00	Spoil access ad.	ID 300-312 RR 365-395	TR 360
0028.1170.00	Spoil access ad.	ID 385-395 RR 465-495	RR 365-395
0028.1174.00	Spoil access ad.	ID 485-495 RR 570-600	TR 565 RR 465-495

ID = Inner diameter of the steel pipe

RR = Ram ring

TR = TERRA Ram

T/TU = TERRA Piercing Tool



Spoil access adapter

### Wall thickness

Wall thickness must be of sufficient size and strength to withstand the forces produced by the TERRA-Ram when driving the pipe through the ground, otherwise the pipe may buckle during ramming procedures.

Ø Steel pipe	Min. wall thickness
less than 300 mm (< 12")	6 mm
300 – 600 mm (12 – 24")	8 mm
600 – 800 mm (24 – 32")	10 mm
800 – 1'200 mm (32 – 48")	13 - 16 mm
over 1'200 mm (> 48")	18 mm

If total ramming length is over 40 m it is recommended to increase these minimum wall thicknesses by 25 %.



Wall thickness

### You want to service your ram yourself and need the necessary service parts? No problem!

For each ram we offer:

- Heavy Duty C-Spanner
- Heavy Duty ring spanner
- Service parts kit
- Tool kit

Tell us the model and the serial number of your TERRA ram. We can then immediately despatch your service parts.



Heavy Duty ring spanner



## More TERRA Products

The World of Trenchless Technology

### HDD Drills

TERRA-JET



### HDD Pit Launched Machines

TERRA MINI-JET

TERRA-PIT



### Thrust Boring Machines

TERRA-JACK



### Cable and Rod Bursters

TERRA-EXTRACTOR

TERRA-HYDROCRACK



### Piercing Tools

TERRA-HAMMER Serie T / TU



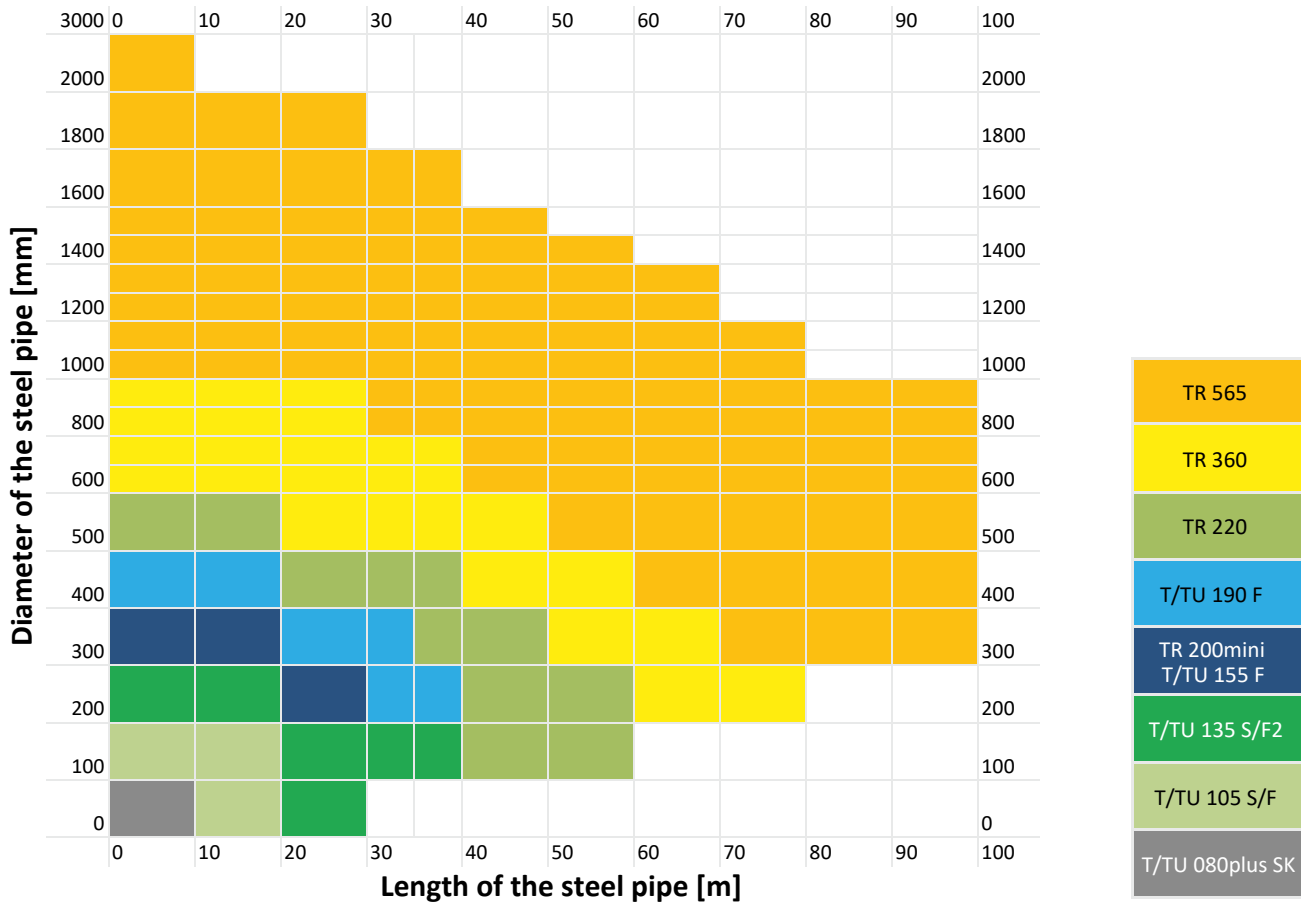
# Full Listing of available TERRA-Rams

## Technical Datas

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TERRA AG  
für Tiefbautechnik  
Hauptstrasse 92  
6260 Reiden  
Schweiz

Phone + 41 62 749 10 10  
Fax + 41 62 749 10 11  
office@terra-eu.eu

[www.boreshop.com](http://www.boreshop.com)