

Drilling Rig  
**LB 45**

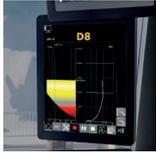
EN-US

LB 2005.07

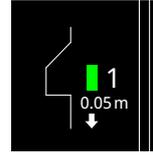


**LIEBHERR**

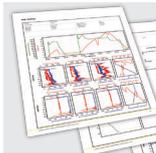
# Concept and characteristics



**PDE**<sup>®</sup>  
Process Data Recording



Kelly  
Visualization



**PDR2**  
Process Data Reporting



Ground  
Pressure  
Visualization



**LIPOS**<sup>®</sup>  
Positioning System



Radio remote  
control



**LiDAT**<sup>®</sup>  
Data Transmission



Concrete  
pump



## The robust universal machine for a wide variety of applications:

- Kelly drilling
- Continuous flight auger drilling
- Full displacement drilling
- Double rotary drilling
- Down-the-hole drilling
- Soil mixing

## Assistance systems:

- Cruise Control for all main functions
- Joystick control for all machine functions
- Automatic shake-off function for working tools
- Kelly Visualization
- Ground Pressure Visualization
- Radio remote control
- Radio remote control for concrete pump
- Drilling assistant (single-pass process)
- Leader inclination memory
- Display of auger filling level
- Kelly winch with freewheeling and with slack rope monitoring and prevention

# Technical data

## Engine

Power rating according to ISO 9249, 390 kW (523 hp) at 1700 rpm  
 Engine type Liebherr D 946 A7-05 or  
 Liebherr D 946 A7-04  
 Fuel tank 185 gal capacity with continuous level  
 indicator and reserve warning  
 Diesel engine complies with 2016/1628 Stage V or NRMM exhaust  
 certification EPA/CARB Tier 4f.

## Hydraulic system

The main pumps are operated by a distributor gearbox.  
 Axial piston variable displacement pumps work in open circuits supplying  
 oil only when needed (flow control on demand). To minimize peak  
 pressure an automatic working pressure cut-off is integrated in the pump.  
 This spares pumps and saves fuel.  
 Pumps for working tools 2x 92 gal/min  
 Separate pump for kinematics 48 gal/min  
 Hydraulic oil tank 211 gal  
 Max. working pressure 5,584 PSI  
 A system of electronically monitored pressure and return filters cleans the  
 hydraulic oil. Any clogging is displayed in the cabin. The use of synthetic  
 environmentally friendly oil is also possible.

## Crawlers

Propulsion through axial piston motor, hydraulically released multi-disc  
 brake, maintenance-free crawler tracks, hydraulic chain tensioning device.  
 Drive speed 0-0.99 mph  
 Track force 167,483 lbf  
 Width of 3-web grousers 39.4 inch  
 Option:  
 Width of 3-web grousers 35.4 inch  
 Transport width 11.5 ft

## Noise emission

Noise emissions correspond with 2000/14/EC directive.  
 Emission sound pressure level  $L_{PA}$  in the cabin 75.4 dB(A)  
 Guaranteed sound power level  $L_{WA}$  110 dB(A)  
 Option: Eco-Silent Mode  
 Guaranteed sound power level  $L_{WA}$  108 dB(A)  
 Vibration transmitted to the hand-arm system of the  
 machine operator  $< 8.20 \text{ ft/s}^2$   
 Vibration transmitted to the whole body of the  
 machine operator  $< 1.64 \text{ ft/s}^2$

### Remarks:

- Illustrations showing the types of application (e.g. Kelly drilling, continuous flight auger drilling etc.)  
 are examples only.
- Weights can vary with the final configuration of the machine. The figures in this brochure may include options  
 which are not within the standard scope of supply of the machine.

## Swing

Consists of triple-row roller bearing with external teeth and two swing  
 drives, fixed axial piston hydraulic motor, hydraulically released multi-disc  
 holding brake, planetary gearbox and pinion. Selector for 3 speed ranges  
 to increase swing precision.  
 Swing speed from 0-2 rpm continuously variable.

## Control

The control system – developed and manufactured by Liebherr – is  
 designed to withstand extreme temperatures and the many heavy-  
 duty construction tasks for which this machine has been designed.  
 Complete machine operating data are displayed on a high resolution  
 monitor screen. A GSM/GPRS telematics module allows for remote  
 inquiry of machine data and operational conditions. To ensure clarity of  
 the information on display, different levels of data are shown in enlarged  
 lettering and symbols.  
 Control and monitoring of the sensors are also handled by this high  
 technology system. Error indications are automatically displayed on the  
 monitor in clear text. Electro-hydraulic continuous proportional control  
 allows all movements to be performed simultaneously. Two joysticks are  
 required for operation. Pedal control can be converted to hand control.  
 Options:  
 PDE®: Process data recording

## Kelly winch with freewheeling

Line pull effective (1 <sup>st</sup> layer)	94,419 kN
Rope diameter	38 mm
Rope speed	0-210 ft/min

## Auxiliary winch

Line pull effective (1 <sup>st</sup> layer)	22,480 lbf
Rope diameter	20 mm
Rope speed	0-292 ft/min

## Rope crowd system

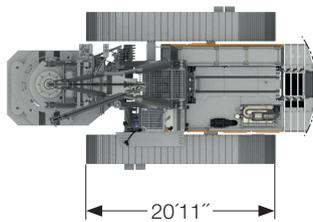
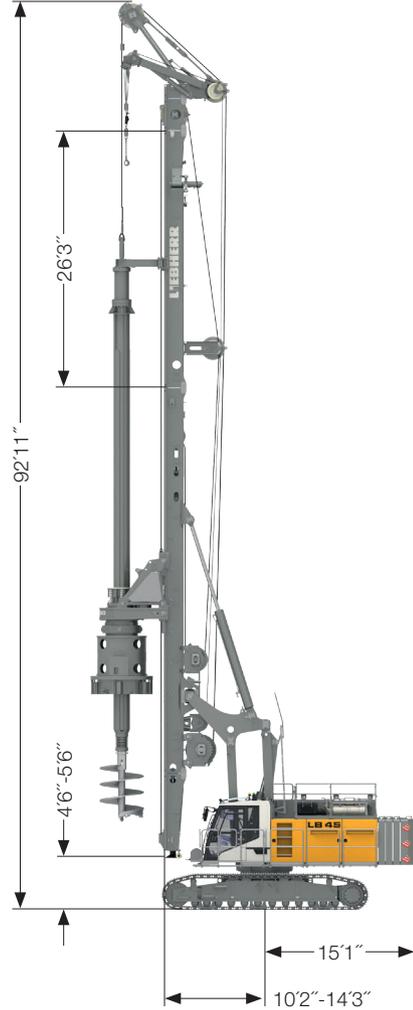
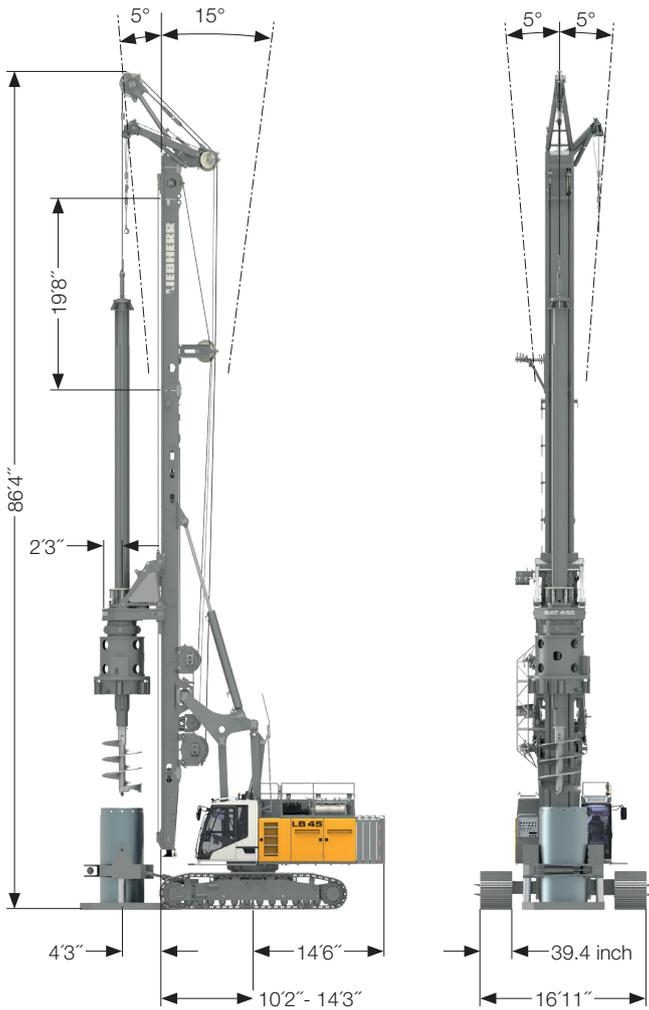
Crowd force (push/pull)	89,923 lbf
Line pull (effective)	44,961 lbf
Rope diameter	28 mm
Travel with standard leader between mechanical limit stops	58.4 ft
Rope speed	0-230 ft/min

The winches are outstanding in their compact design and easy assembly.  
 Propulsion is via a maintenance-free planetary gearbox in oil bath.  
 Load support by the hydraulic system; additional safety factor provided by  
 a spring-loaded, multi-disc holding brake. All line pull values are effective  
 values. The efficiency factor of approx. 25 % has already been deducted.

# Dimensions

Standard leader

Folding leader



- R 14'9" (44,092 lbs)
- R 15'4" (50,706 lbs)
- R 16'4" (50,706 t + rear support unit)

## Operating weight

Total weight with 35.4 inch 3-web grousers	254,192 lbs
Total weight with 39.4 inch 3-web grousers	255,736 lbs

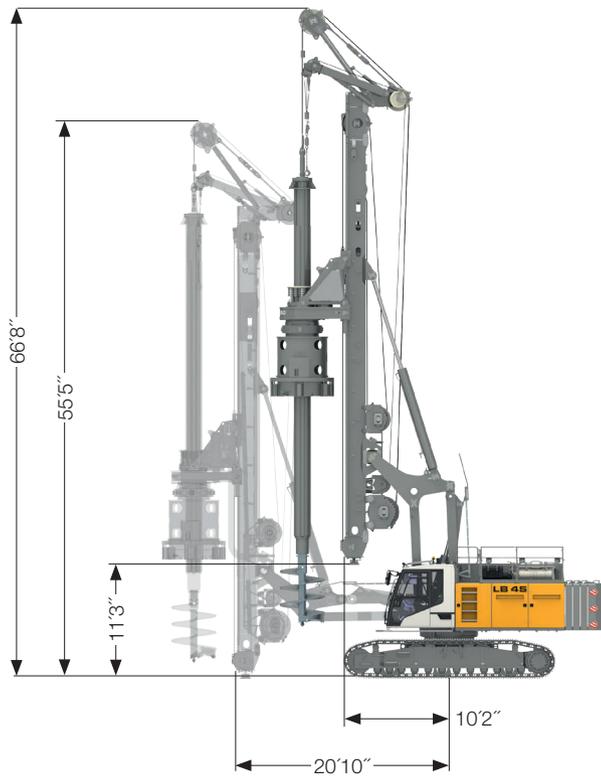
The operating weight includes the basic machine LB 45 with rotary, Kelly bar MD 36/3/36, 44,092lbs counterweight and equipment for casing oscillator.

## Operating weight

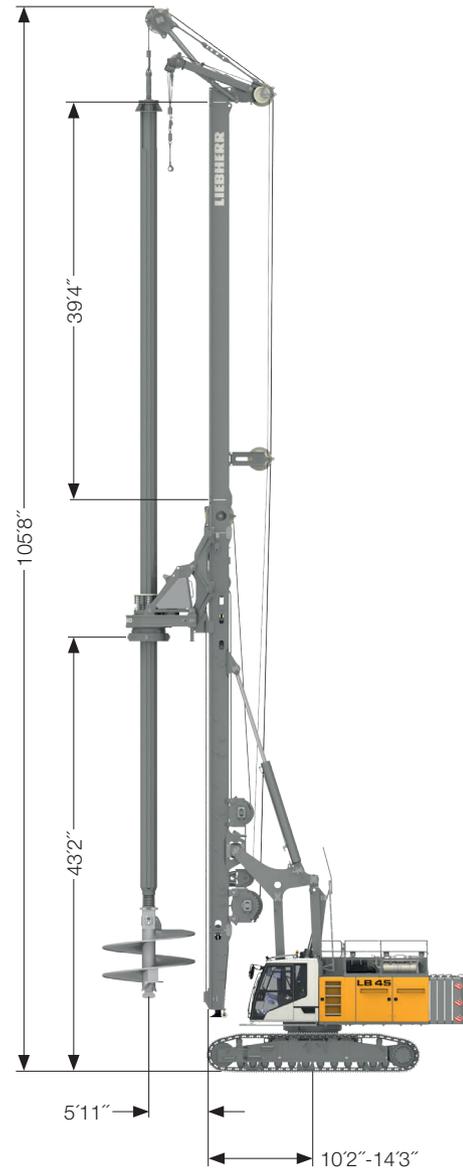
Total weight with 35.4 inch 3-web grousers	267,420 lbs
Total weight with 39.4 inch 3-web grousers	268,963 lbs

The operating weight includes the basic machine LB 45 with rotary, Kelly bar MD 36/4/48 and 50,706lbs counterweight. Equipment for casing oscillator not included.

## Low Head



## Kelly Only



### Operating weight

Total weight with 35.4 inch 3-web grousers	247,800 lbs
Total weight with 39.4 inch 3-web grousers	249,342 lbs

The operating weight includes the basic machine LB 45 with rotary, Kelly bar MD 36/4/30 and 50,706lbs counterweight. Equipment for casing oscillator not included.

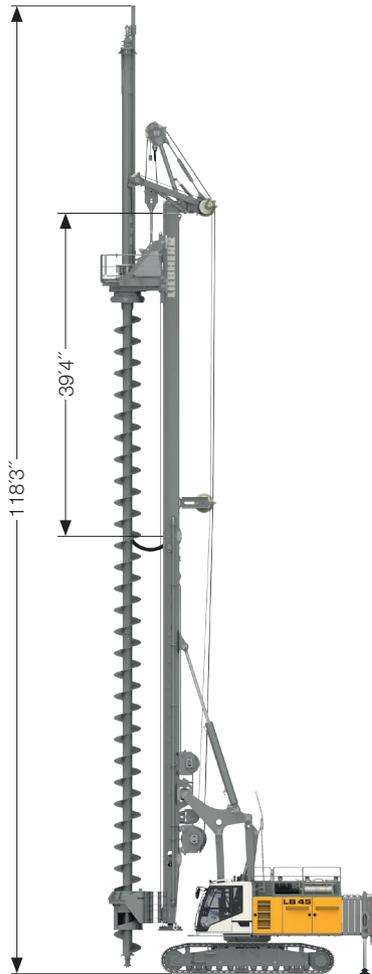
The line pull of the Kelly winch is reduced to 56,202 lbf when working at a radius exceeding 14.3ft.

### Operating weight

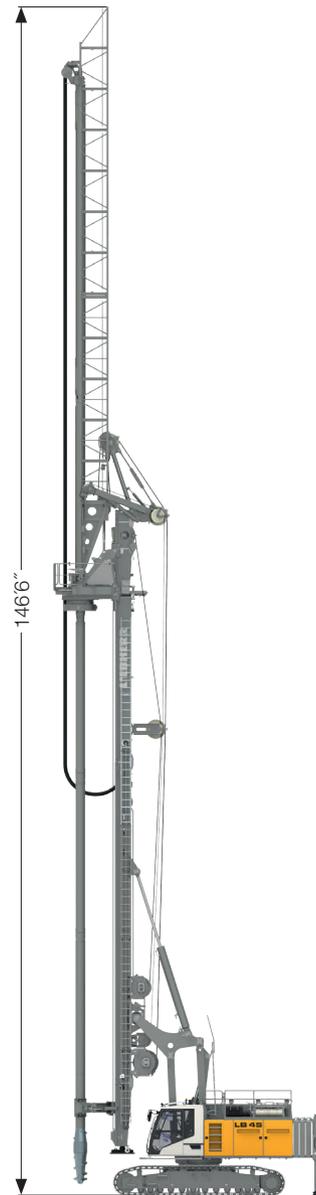
Total weight with 35.4 inch 3-web grousers	288,805 lbs
Total weight with 39.4 inch 3-web grousers	290,348 lbs

The operating weight includes the basic machine LB 45 with rotary, Kelly bar MD 36/4/93 and 50,706lbs counterweight. Equipment for casing oscillator not included.

## Single-Pass



## Lattice boom extension



### Operating weight

Total weight with 35.4 inch 3-web grousers	269,845 lbs
Total weight with 39.4 inch 3-web grousers	271,389 lbs

The operating weight includes the basic machine LB 45 with rotary, 26.2 ft Kelly extension, auger cleaner Ø 39.4 inch and 50,706 lbs counterweight. Equipment for casing oscillator not included.

### Operating weight

Total weight with 35.4 inch 3-web grousers	288,805 lbs
Total weight with 39.4 inch 3- web grousers	290,348 lbs

The operating weight includes the basic machine LB 45 with rotary, 59.1 ft Kelly extension, drill rod 68.9 ft and 50,706 lbs counterweight. Equipment for casing oscillator not included.

# Combined applications

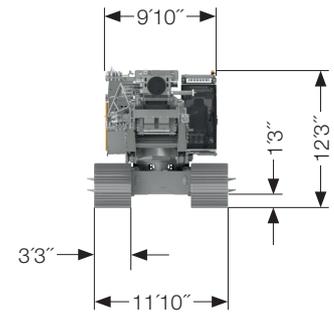
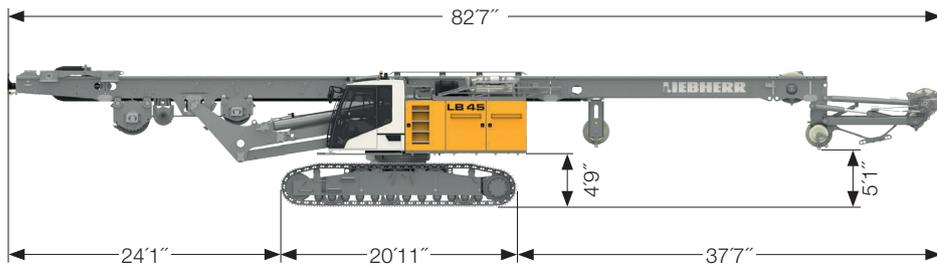
## Combined applications

							
	Long crowd distance	Short crowd distance	Drilling axis 4.3 ft*	Drilling axis 5.9 ft*	Lattice boom extension	Short leader lower part	Standard leader lower part
 Standard leader	Kelly CFA FDD CCFA DTH WSM	Kelly	Kelly CFA FDD CCFA DTH WSM	Kelly	FDD WSM (BAT)	Kelly WSM	Kelly CFA FDD CCFA DTH WSM
 Folding leader	Kelly CFA FDD CCFA DTH WSM	Kelly	Kelly CFA FDD CCFA DTH WSM	Kelly	FDD WSM (BAT)	Kelly WSM	Kelly CFA FDD CCFA DTH WSM
 Low Head	Kelly CFA FDD CCFA DTH WSM		Kelly CFA FDD CCFA DTH WSM	Kelly		Kelly WSM	Kelly CFA FDD CCFA DTH WSM
 Kelly Only		Kelly	Kelly	Kelly		Kelly	Kelly
 Single-Pass	CFA FDD WSM		CFA FDD WSM			WSM	CFA FDD WSM

\* Distance from drilling axis to front edge of leader

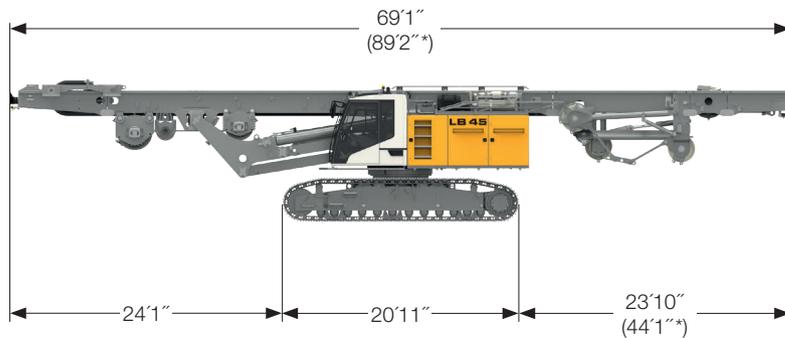
Kelly Kelly drilling  
 CFA Continuous flight auger drilling  
 FDD Full displacement drilling  
 CCFA Double rotary drilling  
 DTH Down-the-hole drilling  
 WSM Wet Soil Mixing

# Transport and weights



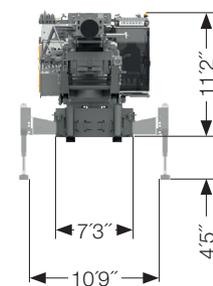
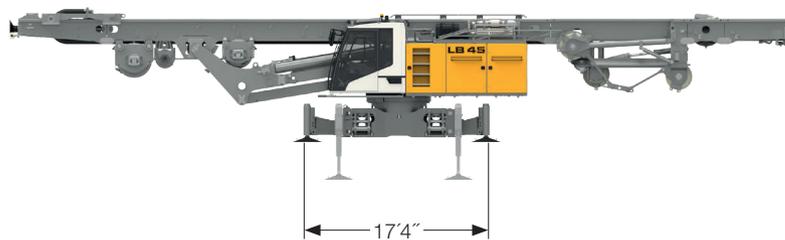
## Standard leader (19.7 ft leader upper part)

includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight. 170,858 lbs



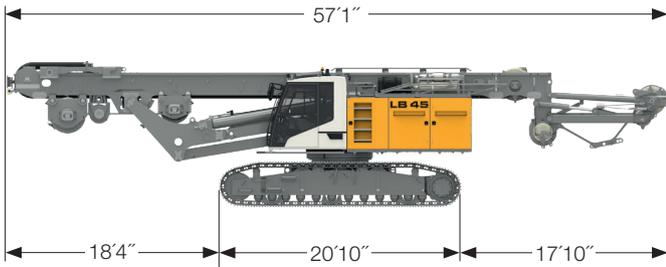
## Folding leader (26.2 ft leader upper part)

includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight. 173,504 lbs  
\* Transport length leader not folded



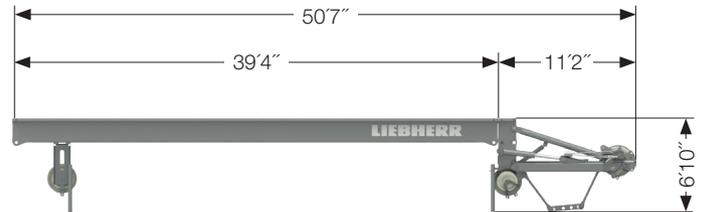
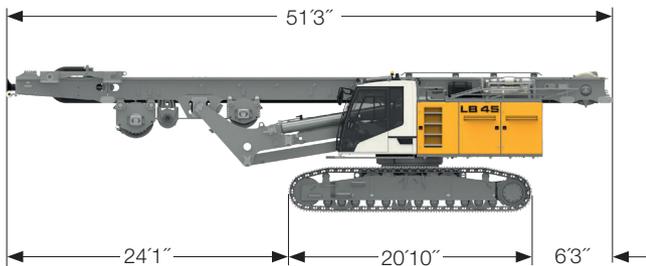
## Folding leader without crawlers

includes the basic machine (fully tanked and ready for operation) with leader, jack-up system and adapter for casing oscillator without attachments (such as rotary, Kelly bar etc.), without counterweight and without crawlers. 136,025 lbs



**Low Head**

includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight. 163,583 lbs

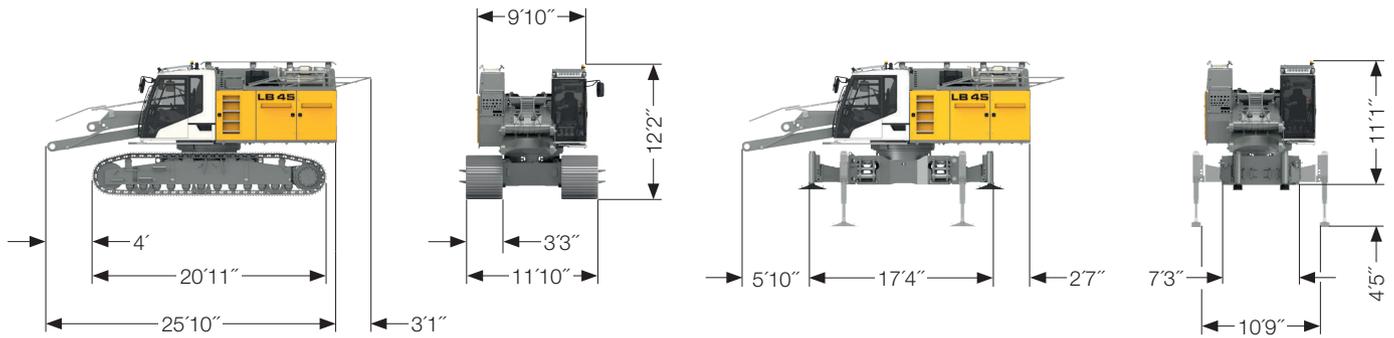


**Kelly Only and Single-Pass**

Kelly Only without 39.4 ft leader extension and leader top 161,599 lbs  
 includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight

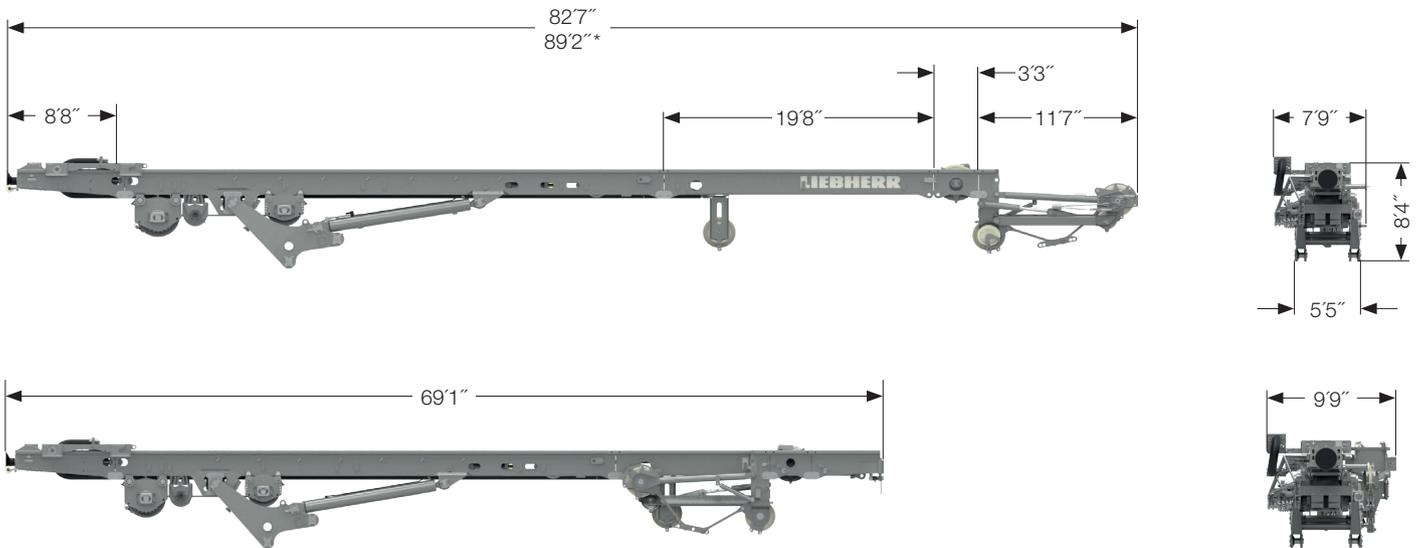
Single-Pass without 39.4 ft leader extension and leader top 159,835 lbs  
 includes the basic machine (fully tanked and ready for operation) with leader, without attachments (such as rotary, Kelly bar etc.) and without counterweight

39.4 ft leader extension with leader top 12,566 lbs



### Carrier machine versions

without jack-up system, counterweight and adapter for casing oscillator	113,317 lbs
with jack-up system and adapter for casing oscillator, without counterweight and crawlers	75,839 lbs



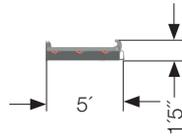
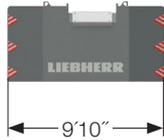
### Leader versions

Standard leader	57,540 lbs
Folding leader	60,186 lbs
Standard leader lower part	3,306 lbs
19.7 ft leader extension	5,070 lbs
26.2 ft leader extension	7,495 lbs
39.4 ft leader extension	8,377 lbs
Leader top	4,188 lbs
39.4 inch leader extension with pulley support	1,763 lbs
Short leader lower part	1,102 lbs

### Options

Jack-up system	4,850 lbs
Adapter for casing oscillator	2,425 lbs
Concrete supply line	1,102 lbs
All round platform with railings	440 lbs

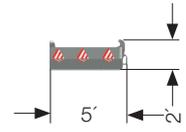
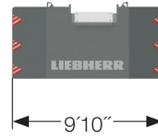
\* Transport length folding leader



**Rear counterweight**

Weight

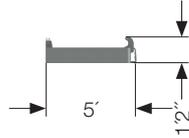
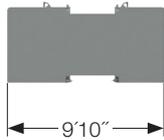
11,023 lbs



**Rear counterweight**

Weight

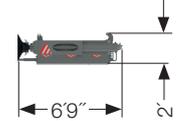
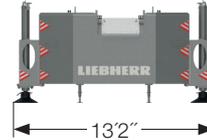
17,636 lbs



**Intermediate counterweight**

Weight

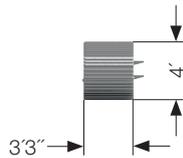
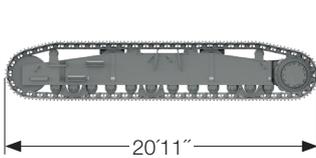
11,023 lbs



**Rear counterweight with rear support unit**

Weight

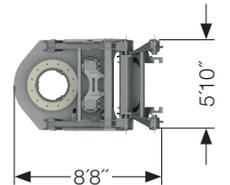
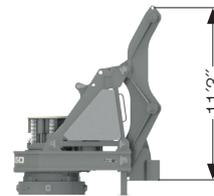
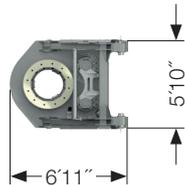
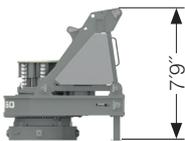
17,636 lbs



**Crawler**

Left / right

22,708 lbs



**BAT 450**

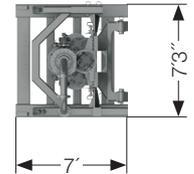
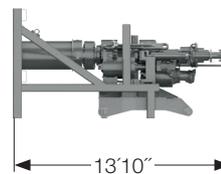
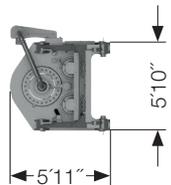
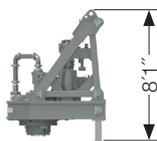
Transport weight

19,400 lbs

**BAT 450 with adapter for drilling axis 5.9ft**

Transport weight

22,487 lbs



**MAT 120**

Transport weight

13,227 lbs

**DBA 200**

Transport weight with 3,527 lbs transport frame

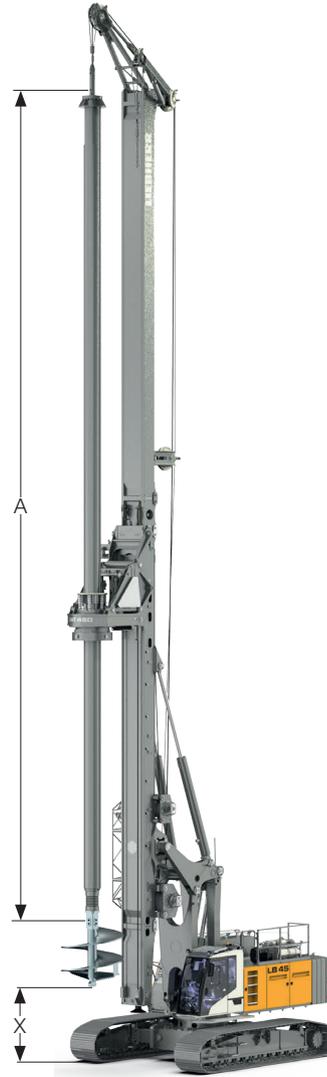
19,180 lbs

Weights can vary with the final configuration of the machine. The figures in this brochure may include options which are not within the standard scope of supply of the machine.

# Kelly drilling

Standard leader with short leader lower part

Kelly Only with 5.9 ft drilling axis



## Performance data

Rotary drive – torque	333,378 lbf-ft		
Rotary drive – speed	37 rpm		
	Drilling axis 4.3 ft	Drilling axis 5.9 ft	
Max. drilling diameter cased*	6.6 ft	9.2 ft	
Max. drilling diameter uncased	7.5 ft	10.5 ft	
Max. drilling diameter uncased with short leader lower part	12.5 ft	14.8 ft	

Above applications are sample illustrations. Other drilling diameters available on request.

\* Depending on casing driver configuration

## Drilling depths for Kelly drilling

Technical data Kelly bars			Drilling depths															
Model	Length [ft]	Weight [lbs]	Low Head				Standard leader				Folding leader				Kelly Only			
			X = [ft]		Depth [ft]		X = [ft]		Depth [ft]		X = [ft]		Depth [ft]		X = [ft]		Depth [ft]	
MD 36/3/30 SD	39.0	16,755	12.5	12.1	92.8	94.8	32.2	31.8	92.8	94.8	38.7	38.4	92.8	94.8	39.4	36.4	92.8	94.8
MD 36/3/36 SD	45.6	20,282	5.9 <sup>1/2</sup>	5.6 <sup>1</sup>	112.2 <sup>1/2</sup>	114.5 <sup>1</sup>	25.6	25.3	112.5	114.5	32.2	31.8	112.5	114.5	39.4	36.4	112.5	114.5
MD 36/4/30 SD	32.6	18,739	19.0	18.7	92.8	94.8	38.7	38.4	92.8	94.8	45.3	44.9	92.8	94.8	39.4	36.4	92.8	94.8
MD 36/4/42 SD	42.5	24,030	9.2 <sup>1</sup>	8.9 <sup>1</sup>	132.2 <sup>1</sup>	134.5 <sup>1</sup>	28.9	28.5	132.5	134.5	35.4	35.1	132.5	134.5	39.4	36.4	132.5	134.5
MD 36/4/48 SD	49.0	26,675	4.3 <sup>1/2</sup>	3.9 <sup>1</sup>	152.2 <sup>1/2</sup>	154.2 <sup>1</sup>	24.0	23.6	152.2	154.2	30.5	30.2	152.2	154.2	39.4	36.4	152.2	154.2
MD 36/4/54 SD	52.3	28,660	-	-	-	-	19.0	18.7	171.9	173.9	25.6	25.3	171.9	173.9	38.7	36.4	171.9	173.9
MD 36/4/60 SD	57.3	31,085	-	-	-	-	14.1	13.8	191.6	193.6	20.7	20.3	191.6	193.6	33.8	33.5	191.6	193.6
MD 36/4/66 SD	62.2	33,730	-	-	-	-	9.2 <sup>1</sup>	8.9 <sup>1</sup>	211.3 <sup>1</sup>	212.9 <sup>1</sup>	15.7	15.4	211.3	212.9	28.9	28.5	211.3	212.9
MD 36/4/72 SD	67.1	36,155	-	-	-	-	4.3 <sup>1/2</sup>	3.9 <sup>1</sup>	231.0 <sup>1/2</sup>	232.9 <sup>1</sup>	10.8 <sup>1</sup>	10.5	231.0 <sup>1</sup>	232.9	24.0	23.6	231.0	232.9
MD 36/4/78 SD	72.0	39,683	-	-	-	-	-	-	-	-	5.9 <sup>1/2</sup>	5.6 <sup>1</sup>	250.7 <sup>1/2</sup>	252.6 <sup>1</sup>	19.0	18.7	250.7	252.6
MD 36/4/84 SD	77.0	42,328	-	-	-	-	-	-	-	-	1.0 <sup>1/2</sup>	0.7 <sup>1/2</sup>	270.3 <sup>1/2</sup>	272.3 <sup>1/2</sup>	14.1	13.8	270.3	272.3
MD 36/4/90 SD	81.9	45,635	-	-	-	-	-	-	-	-	-	-	-	-	9.2 <sup>1</sup>	8.9 <sup>1</sup>	290.0 <sup>1</sup>	292.0 <sup>1</sup>
MD 36/4/93 SD	84.5	46,517	-	-	-	-	-	-	-	-	-	-	-	-	6.6 <sup>1</sup>	6.2 <sup>1</sup>	299.5 <sup>1</sup>	301.5 <sup>1</sup>
MD 36/4/96 SD	86.8	47,399	-	-	-	-	-	-	-	-	-	-	-	-	4.3 <sup>1/2</sup>	3.9 <sup>1</sup>	309.7 <sup>1/2</sup>	311.7 <sup>1</sup>

<sup>1</sup> When using a short leader lower part an assist crane is required for installation.

Drilling axis 4.3 ft      Drilling axis 5.9 ft

<sup>2</sup> Installation only possible with assist crane

Other Kelly bars available on request.

When using a casing oscillator, value X has to be reduced by 5.2ft.

When using a Kelly bar guide, value X has to be reduced by 3.6ft.

When using a short leader lower part the drilling depth is reduced by 5.7ft for a drilling axis of 4.3ft, and by 7.6 ft for a drilling axis of 5.9ft.

Length of drilling tool 6.2ft

# Continuous flight auger drilling

Folding leader

Single-Pass



## Performance data

Rotary drive – torque	302,400 lbf-ft
Rotary drive – speed	37 rpm
Max. drilling diameter*	3.9 ft

	Low Head	Standard leader	Folding leader	Single-Pass
Drilling depth without Kelly extension	34.8 ft	54.5 ft	61.0 ft	74.1 ft
Drilling depth with 26.2 ft Kelly extension	61.0 ft	80.7 ft	87.3 ft	100.4 ft
Max. pull force	224,808 lbf	224,808 lbf	224,808 lbf	188,839 lbf

Above drilling depths take into account that an auger cleaner is used and the cardan joint has been removed.  
 Above drilling depths are valid for the use of standard tools and for an X value of 0.75 ft (see above illustration).

\* Other drilling diameters available on request

# Full displacement drilling

Folding leader

Lattice boom extension



<b>Performance data</b>					
Rotary drive – torque	302,400 lbf-ft				
Rotary drive – speed	37 rpm				
Max. drilling diameter*	2.6 ft				
	Low Head	Standard leader	Folding leader	Single-Pass	
Drilling depth without Kelly extension	37.1 ft	56.8ft	63.3ft	76.4 ft	
Drilling depth with 26.2 ft Kelly extension	63.3ft	83.0ft	89.6ft	102.7 ft	
Drilling depth with 59.1 ft lattice boom extension	-	115.8ft	122.4ft	-	
Max. pull force	224,808 lbf	224,808 lbf	224,808 lbf	188,839 lbf	

Above drilling depths are valid for standard tools and for an X value of 1.5 ft (see above illustration).

\* Other drilling diameters available on request

# Double rotary drilling

DBA 200



## Performance data

Rotary drive I – torque	0-154,888 lbf-ft		
Rotary drive I – speed	0-17 rpm		
Rotary drive II – torque	0-77,444 kNm		
Rotary drive II – speed	0-37 rpm		
Max. drilling diameter*	3 ft		
	Low Head	Standard leader	Folding leader
Drilling depth**	35.4 ft	55.1 ft	61.7 ft
Max. pull force	184,343 lbf	184,343 kN	184,343 kN

Above drilling depths are valid for the use of standard tools and for an X value of 3ft (see above illustration).

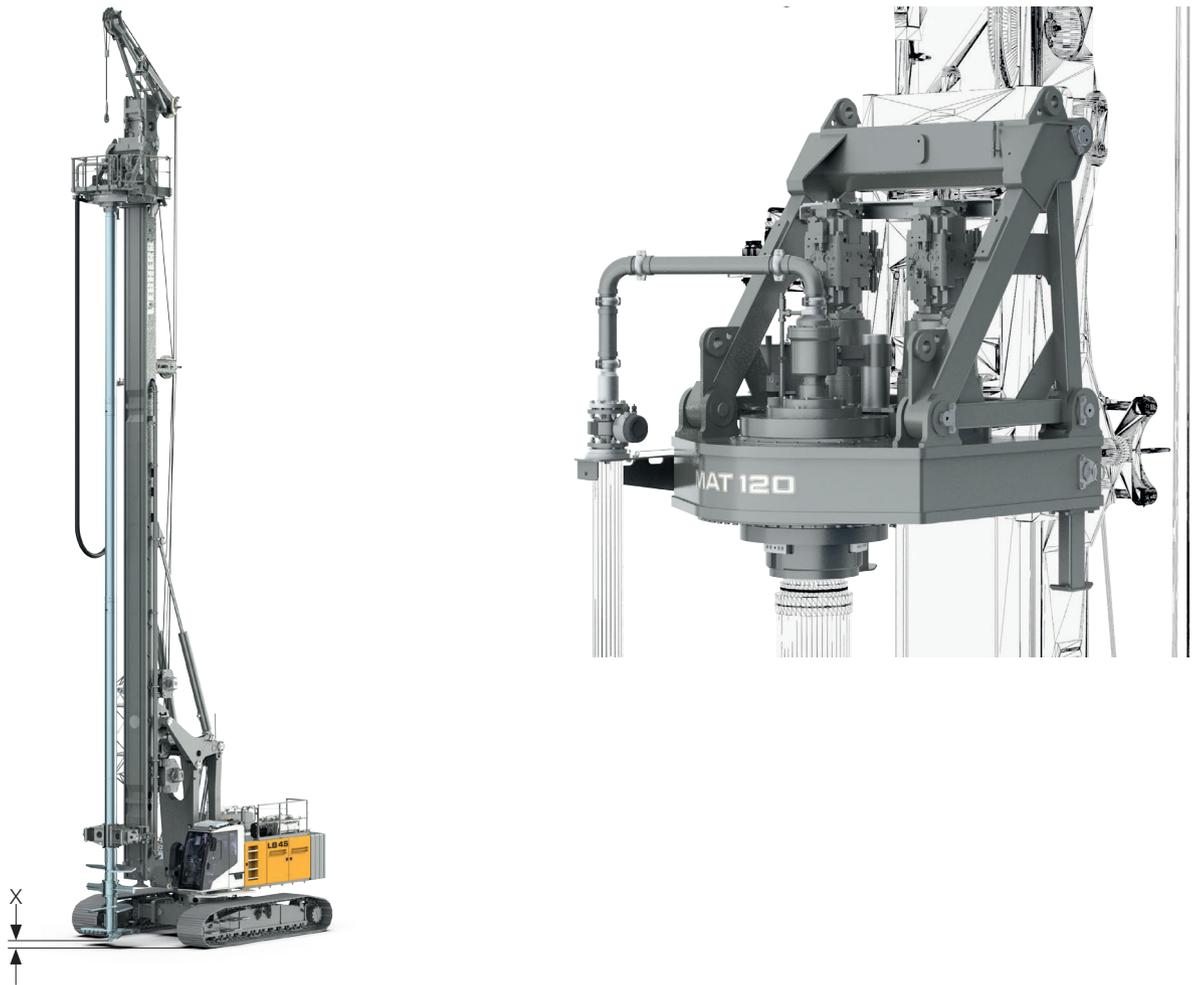
Due to differences in the max. admissible load capacities, the combinations of drilling depth and drilling diameter may be limited.

\* Other drilling diameters available on request

\*\* When using a protective hose, the maximum drilling depth has to be reduced by 2.4ft.

# Soil mixing

MAT 120 / BAT 450



## Performance data MAT 120

Rotary drive – torque	84,819 lbf-ft			
Rotary drive – speed	100 rpm			
Max. mixing diameter*	4.9 ft			
	Low Head	Standard leader	Folding leader	Single-Pass
Mixing depth	38.0ft	57.7 ft	64.3ft	77.4 ft
Max. pull force	89,923 lbf	89,923 lbf	89,923 lbf	188,839 lbf

## Performance data BAT 450

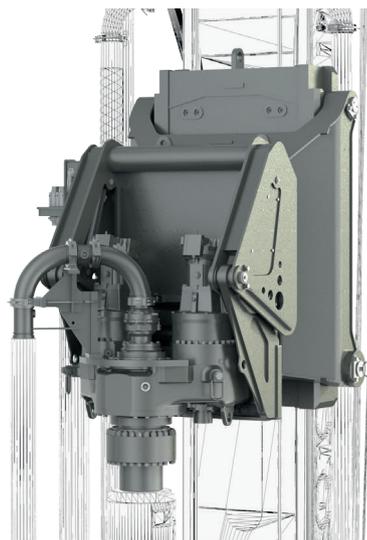
Rotary drive – torque	302,400 lbf-ft			
Rotary drive – speed	37 rpm			
Max. mixing diameter*	7.5 ft			
	Low Head	Standard leader	Folding leader	Single-Pass
Mixing depth	36.4ft	56.1 ft	62.7 ft	75.8ft
Mixing depth with 8m Kelly extension	62.7ft	82.3ft	88.9ft	102.0ft
Mixing depth with 18m lattice boom extension	-	115.2ft	121.7 ft	-
Max. pull force	224,808 lbf	224,808 lbf	224,808 lbf	188,839 lbf

Above mixing depths are valid for the use of standard tools and for an X value of 0.4ft for MAT 120, and 2.0ft for BAT 450 (see above illustration).

\* Other mixing diameters available on request

# Down-the-hole drilling

RHP 10



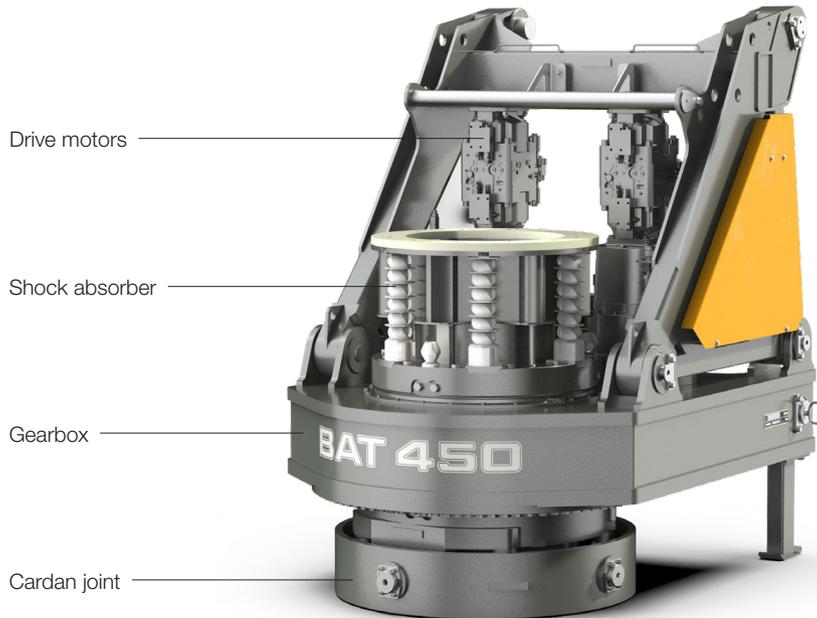
## Performance data

Rotary drive - torque	1 <sup>st</sup> gear	78,181 lbf-ft		
Rotary drive - speed	1 <sup>st</sup> gear	25 rpm		
Rotary drive - torque	2 <sup>nd</sup> gear	39,090 lbf-ft		
Rotary drive - speed	2 <sup>nd</sup> gear	50 rpm		
Max. drilling diameter*		2.7 ft		
			Low Head	Standard leader
Drilling depth			36.7 ft	56.4 ft
Max. pull force			89,923 lbf	89,923 lbf
				Folding leader
				63.3 ft
				89,923 lbf

Above drilling depths are valid for standard tools and for an X value of 1.6 ft (see above illustration).

\* Other drilling diameters available on request

# BAT 450



## Kelly shock absorber:

- Newly developed Kelly shock absorber for highest demands
- Possibility of adjusting the strength of the Kelly shock absorber for different Kelly bar weights

## Highest availability through easy set-up:

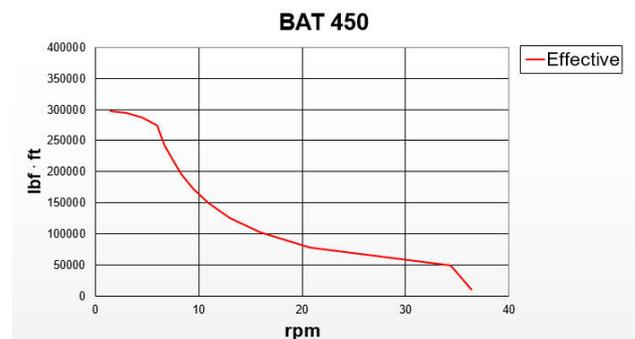
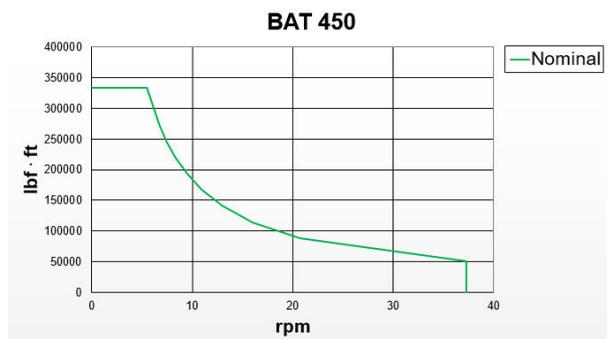
- No mechanical shift gearbox
- Less maintenance required

## Automatic gearbox for best operating comfort:

- No stopping required to change gears
- No interruption of the drilling process
- Continuous optimization of speed
- No interruption of the drilling process

## Flexibility through modular design:

- Exchangeable cardan joint for other casing drivers
- Exchangeable drive adapters for use of other Kelly bars
- Quickly exchangeable equipment for other methods of operation



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