

LINING LOWERING SYSTEMS

# COMPACT AND MODULAR SHAFT LINING



## Herrenknecht Lining Lowering Systems

- › Lining lowering for ore passes and ventilation shafts
- › Lining diameter of up to 5.0m (16.40 ft)
- › Designed for inclined and vertical shafts
- › Modular configuration for various diameters and depths
- › Increased efficiency via compact and reliable hydraulic drive
- › Improved working conditions due to fully remote operation and lower risk exposure for the personnel

**PIONEERING  
UNDERGROUND  
TECHNOLOGIES**



# Lining Lowering Systems

## General overview

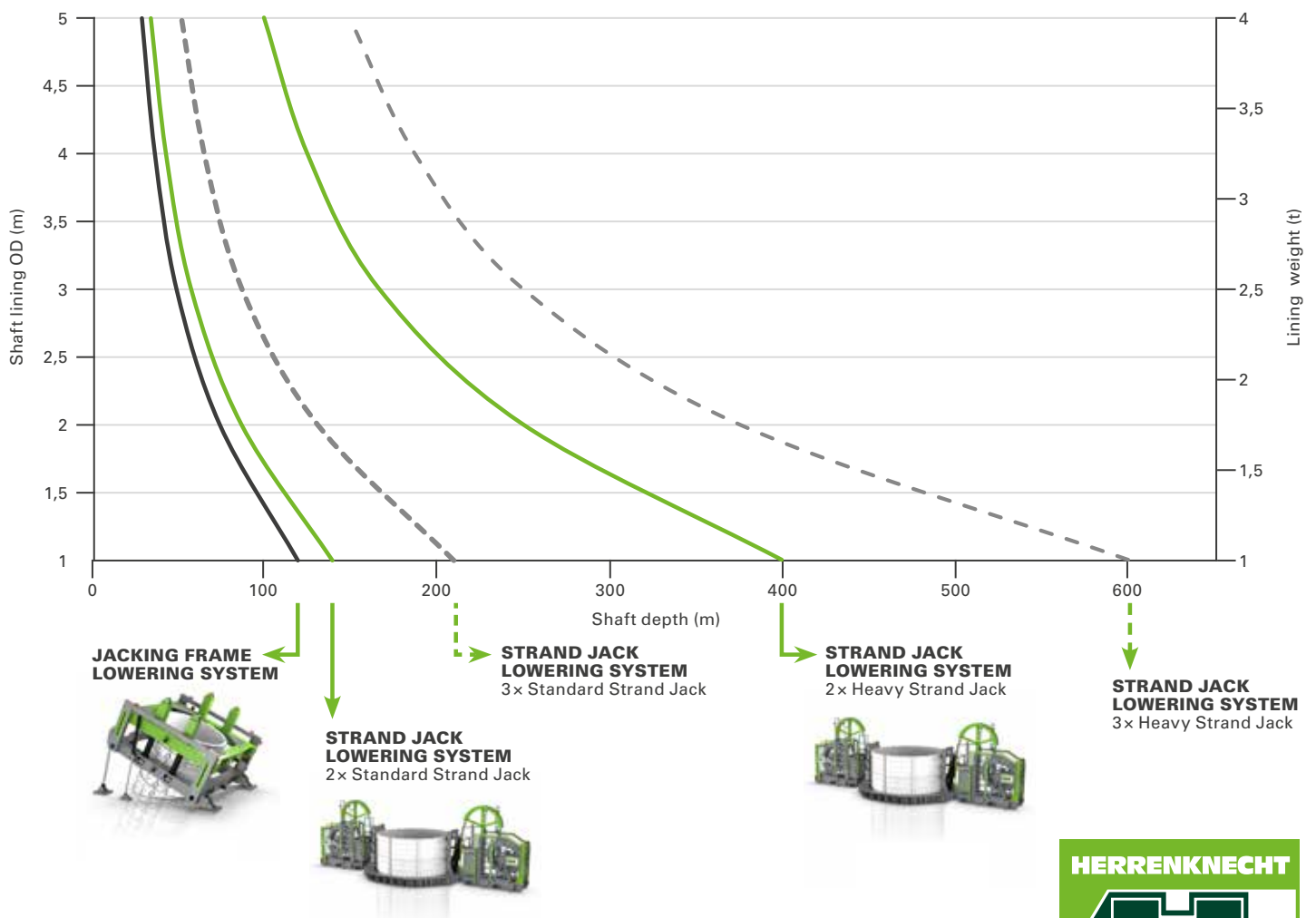
**Herrenknecht Lining Lowering Systems** are the solution for fast and efficient lining of shafts. The highly flexible design of the lowering system allows it to be configured to meet the individual requirements of the lining operation, such as shaft diameter and type of shaft lining.

	JACKING FRAME	STRAND JACK
<b>Diameter range</b> (Shaft lining OD in mm)	1,000–5,000	1,000–5,000
<b>Available motion functions</b>		
› Active (hydraulically driven)	Lowering (thrust)/lifting (pulling)	Lifting (pulling)
› Passive (weight force)	–	Lowering
<b>Ground conditions</b>	Stable geology/Fractured and unstable geology	Stable geology
<b>Shaft alignment</b>	Vertical/Inclined	Vertical
<b>Shaft lining type</b>		
› Concrete – Segments	–	+
› Concrete – In situ	–	+
› Steel – Segments	–	+
› Steel – Rings	+	+
› Polymer – Rings	+	+
› Hybrid lining combination (Concrete/Steel/Polymer)	+	+

## Lining Lowering System

### Lowering capabilities

Theoretically achievable scale referring to the maximum lowering capabilities of each system, depending on lining diameter and lining weight (weight based on 1 m high steel lining rings).



# Lining Lowering Systems – Jacking Frame

## Technical specifications

The **Herrenknecht Jacking Frame Lowering System** is designed to lower shaft lining elements into vertical or inclined shafts also in challenging geological conditions. Lining operations can be carried out either during shaft excavation by Boxhole Back Reaming or on already existing unlined raise boring shafts.

### JACKING FRAME

- › Thrust force: 3,000 kN (674,427 lbf)
- › Pull force: 2,000 kN (449,618 lbf)
- › Payload: 120,000 kg (264,555 lbf)
- › Dimensions for 3.0 m/9.84 ft ID liner (l/w/h): 6.2 m/5.4 m/3.6 m (20.34 ft/17.72 ft/11.81 ft)
- › Drift height (vertical shafts/inclined shafts): 3.6 m/4.7 m (11.81 ft/15.42 ft)
- › Fully remote-controlled alignment and operation
- › All functions are hydraulically operated



Compact and modular jacking frame for lining lowering operation in vertical or inclined shafts.

### HYDRAULIC POWER PACK

- › Power: 74 kW
- › Voltage: 400V – 1,000V
- › Frequency: 50 Hz/60 Hz
- › Cooling: water-cooled
- › Dimensions (l/w/h): 1.5 m/2.8 m/1.9 m (4.92 ft/9.18 ft/6.23 ft)
- › Compact design of the electro-hydraulic drive
- › High noise protection by fully enclosed system



Power pack with PLC control and data recording system.

### WEIGHT

- › Jacking frame: 32,000 kg (70,547 lb)
- › Hydraulic power pack: 4,000 kg (8,818 lb)

### OPTIONAL EQUIPMENT

- › Jacking frame adaptation set for different diameter from 1.0 m to 5.0 m (3.28 ft to 16.40 ft)
- › Lining elements – Interface conversion set
- › Control cabin
- › Transformer
- › Chiller unit



Lining ring with Interface conversion set.

# Lining Lowering Systems – Strand Jack

## Technical specifications

The **Herrenknecht Strand Jack Lowering System** is designed to lower shaft lining elements into vertical shafts in stable geological conditions. The lining operation can be carried out either during shaft excavation by Boxhole Back Reaming or on already existing unlined raise boring shafts.

### LOWERING SYSTEM

- › Holding capacity\* : 1,400 kN (314,732 lbf)
- › Holding capacity\*\* : 4,000 kN (899,236 lbf)
- › Dimensions for 3,0 m/9,84 ft ID liner (l/w/h): 11.2 m/4.5 m/3.7 m (36.75 ft/14.76 ft/12.14 ft)
- › Fully remote-controlled lowering operation

\* Configuration with 2 standard strand jacks  
 \*\* Configuration with 2 heavy strand jacks



Lowering system in standard configuration (both strand jack unit radial to shaft axis).

### POWER PACK

- › Power: 7,5 kW\*
- › Voltage: 400V – 1,000V
- › Frequency: 50 Hz or 60 Hz
- › Compact design of the electro-hydraulic drive

\* For each strand jack unit

### WEIGHT

- › Strand jack unit (each): 5,200 kg (11,464 lb)
- › Circular base frame : 2,400 kg (5,291 lb)



Lowering system in perpendicular configuration (both strand jack unit perpendicular to shaft).

### OPTIONAL EQUIPMENT

- › Adaptation set for different diameter from 1.0 m to 5.0 m (3.28 ft/16.40 ft)
- › Lowering system with 3 standard/heavy strand jacks
- › Control cabin
- › Transformer



The modular design allows fast disassembly and easy transport underground.