**Technical concept of the stage mACHINERY of the Main Stage and Chamber Stage**

Polish naTional Opera

Appendix 4

Technical details in this document represent preliminary assumption by Contracting Party. Contracting Party allows to change the technical details in this document during the preparation of the “Functional and Utility Program”. All the changes need to be confirmed by Contracting Party.

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Technical Concept

1. Opera House
   1. Upper Stage Equipment
      1. Fly Bars

Technical Data

Quantity: 75 pcs.

Type of drive: electromechanical wire rope winch

Length of bar: approx. 26 m (+ 1m extensions on both sides)

No. of lifting ropes: 6 pieces

Lifting Height: approx. 34 m

Payload: max. 1000 kg

Point load: 400 kg (under wire rope)

Lifting Speed: 0.01 - 1.8 m/s with load up to 500 kg

0.01 - 1.2 m/s with load up to 1000 kg

Acceleration: max. 1.2 m/s²

* + 1. Panorama Bars outer

Technical Data

Quantity: 4 pcs.

Type of drive: electromechanical wire rope winch

Length of bar: approx. 12 m

No. of lifting ropes: 4 pieces

Lifting Height: approx. 34 m

Payload: max. 500 kg

Point load: 200 kg (under wire rope)

Lifting Speed: 0.01 - 1.8 m/s

Acceleration: max. 1.2 m/s²

* + 1. Panorama Bars inner

Technical Data

Quantity: 4 pcs.

Type of drive: electromechanical wire rope winch

Length of bar: approx. 12 m

No. of lifting ropes: 4 pieces

Lifting Height: approx. 34 m

Payload: max. 500 kg

Point load: 200 kg (under wire rope)

Lifting Speed: 0.01 - 1.8 m/s

Acceleration: max. 1.2 m/s²

* + 1. Point Hoists

Technical Data

Quantity: 66 pcs.

Type of drive: Moveable (on a rail from gallery right to gallery left) electromechanical wire rope winch

No. of lifting ropes: 1 pieces

Lifting Height: approx. 34.0 m

Payload: 500 kg

Lifting Speed: 0.01 - 1.8 m/s

Acceleration: max. 1.0 m/s²

* + 1. Lighting Bridge

Technical Data

Quantity: 7 pcs. to be mounted on 3 flybars (>1.1.1) each

Type of drive: electromechanical wire rope winch

Length of bar: approx. 25 m

No. of lifting ropes: 6 pieces

Lifting Height: approx. 34 m

Payload: max. 3 x 1000 kg

Point load: 400 kg (under wire rope)

Lifting Speed: 0.01 - 1.8 m/s with load up to 500 kg

0.01 - 1.2 m/s with load up to 1000 kg

Acceleration: max. 1.2 m/s²

* + 1. Lighting Ladders

Technical Data

Quantity: 10 pcs.

Type of drive: Moveable (on a rail) electromechanical wire rope winch – 2 pcs. each rail

Length of bar: approx. 4 m

No. of lifting ropes: 2 pieces

Lifting Height: approx. 19 m

Payload: max. 500 kg

Point load: 200 kg (under wire rope)

Lifting Speed: 0.01 - 1.2 m/s

* + 1. Crane System Stage Right and Stage Left

Technical Data

Quantity: 2 pcs.

Type of drive: Electrical Chain hoist system

No. of crane rails: 2 pcs. per side stage

Length of crane rail: approx. 20 m

No. of movable crane beams: 4 pcs. per side stage

No. of electrical crane trolley: 16 pcs per side stage (4 per moveable crane beam)

Length of moveable crane beam: approx. 14.5 m

No of. Chain Hoists: 16 pcs per side stage

No of electric. chain hoist Trolley: 16 pcs. per side stage

Lifting height of chain hoists: approx. 14.0 m

Payload: 250kg (2.5kN)

Standard: DGUV 17 (former BGV C1)

Lifting speed: 2.5/ 8 m/min (2 speeds switchable)

Speed of electric. Chain hoist trolley: 2.5/ 8 m/min (2 speeds switchable)

* + 1. Rear stage Point Hoists

Technical Data

Quantity: 20 pcs.

Type of drive: Moveable (on a rail) electromechanical rope winch

No. of lifting ropes: 1 pieces

Lifting Height: approx. 24.0 m

Payload: 500 kg

Lifting Speed: 0.01 - 1.8 m/s

Acceleration: max. 1.2 m/s²

* + 1. Rear stage Flybars

Technical Data

Quantity: 26 pcs.

Type of drive: electromechanical wire rope winch

Length of bar: approx. 23 m

No. of lifting ropes: 6 pieces

Lifting Height: approx. 24 m

Payload: max. 500 kg

Point load: 200 kg (under wire rope)

Lifting Speed: 0.01 - 1.8 m/s with load up to 500 kg

0.01 - 1.2 m/s with load up to 1000 kg

Acceleration: max. 1.2 m/s²

* + 1. Proscenium Bridge

Technical Data

Quantity: 1 pcs.

Type of drive: Electromechanical wire rope winch with horizontal drum

Length of bar: approx. 25 m

No. of lifting ropes: 6 pieces

Lifting Height: approx. 20 m

Payload: max. 2000 kg

Point load: 500 kg (under wire rope)

Additional equipment: separately movable subtitle LED display

* + 1. Proscenium Fly Bars + curtains (Wagner, Guillotine (sound proof), Gauze, Bi-Parting)

Technical Data

Quantity: 5 pcs.

Type of drive: Electromechanical wire rope winch with vertical drum

Length of bar: approx. 22 m

No. of lifting ropes: 6 pieces

Lifting Height: approx. 34 m

Payload: max. 1000 kg

Point load: 400 kg (under wire rope)

Lifting Speed: 0.01 - 1.8 m/s with load up to 500 kg

0.01 - 1.2 m/s with load up to 1000 kg

Acceleration: max. 1.2 m/s²

* + 1. Harlequin™ foldable floor

Technical Data

Quantity: 2 pcs.

Type of drive: electromechanical wire rope winch

Lifting Height: approx. 34 m

Foldable dance floor with possibility to store it vertically hanging.

Segment 1 – 23 x 9 m – flybar 60 (load capacity increase – to be checked)

Segment 2 – 23 x 9 m – flybar 62 (load capacity increase – to be checked)

* + 1. Fire Curtains

Technical Data

Quantity: 6 pcs.

Type of drive: Electromechanical wire rope winch

Additional info: According to Polish Fire regulations, sound proof

* 1. Lower Stage Equipment – all areas at stage level
     1. Main Stage elevators with stage traps

Technical Data

Quantity: 6 pcs.

Type of drive: Electromechanical wire rope drive or rock and pinion/ electrohydraulic drive

Type of platform Double Deck

Positioning system: Encoder + limit switches

Dimensions: 3.0 x 23.0 m

Height between platforms: approx. 9 m

Quantity of stage traps: 11 pcs. Per elevator

Dimensions of stage traps: 1.0 x 1.2 m

Stage trap drive: Electromechanical drive

Static load: 1000 kg/m2

Static point load: 1000 kg on space 20x20 cm

Dynamic load: 400 kg/m²

Lifting speed: 0.01 – 0.8 m/s

* + 1. Stage Wagons – sinking to stage level

Quantity: 4 pcs.

Type of drive: Friction Drive System only for one direction

Positioning system: Magnetic sensor system

Guiding system: Magnetic sensor system

Power: Battery power on wagon

Platform dimensions: 23.0 x 3.0m

Wagon height: 200 mm in total incl. wooden floor

Static load: 500 kg/m²

Point load: 1000 kg point load on 25x25 cm

Dynamic load: 250 kg/m²

Speed: 0.01 – 0.8 m/s

Accuracy: +/- 2 mm

Number of traps: 11 pcs. (Manually opening)

Size of traps: 1.0 x 1.2m

* + 1. Stage Platform

Quantity: 1 pcs.

Type of drive: Friction Drive System

Positioning system: Magnetic sensor system

Guiding system: Magnetic sensor system

Power: Battery power on wagon

Platform dimensions: 23.0 x 12.0m

Wagon height: 200 mm in total incl. wooden floor

Static load: 500 kg/m²

Point load: 1000 kg point load on 25x25 cm

Dynamic load: 250 kg/m²

Speed: 0.01 – 0.8 m/s

Accuracy: +/- 2 mm

* + 1. Revolve Wagon

Technical Data

Wagon:

Quantity: 1 pcs.

Type of drive: Rack & Pinion Drive/ Friction Drive System only for one direction

Positioning system: Encoder on drive unit

Power supply: Spring loaded Cable Drum fixed on back stage

Platform dimensions: 23.0 x 22.0 m (width x depth)

Static load: 1000 kg/m²

Dynamic load: 400 kg/m²

Speed: 0.01 – 0.5 m/s

Accuracy: +/- 2 mm

Revolving disc outer :

Quantity: 1 pcs.

Outer diameter: 21.5m

Type of drive: multiple Friction drive system

Positioning system: Bar code or equivalent non-friction system

Power: Spring loaded Cable Drum fixed on back stage

Static load: 1000 kg/m²

Dynamic load: 500 kg/m²

Speed at circumference: 0.01 – 0.8 m/s

Accuracy: +/- 3 mm

Revolving disc inner (build in outer disc) :

Quantity: 1 pcs.

Outer diameter: 16 m

Type of drive: multiple Friction drive system

Positioning system: Bar code or equivalent non-friction system

Power: Spring loaded Cable Drum fixed on back stage

Static load: 1000 kg/m²

Dynamic load: 500 kg/m²

Speed at circumference: 0.01 – 0.8 m/s

Accuracy: +/- 3 mm

* + 1. Orchestra Lifts 1

Technical Data

Quantity: 1 pcs.

Type of platform Double Deck

Type of drive: Lifting column Spiralift 4x18”

Positioning system: Encoder on drive train

Power supply on platform: Cable Chain (power + data cable)

Platform dimensions: approx.. 23.0 x 1.3 m (width x depth)

Area: approx.. 30.0 m²

Height between double deck: approx.. 2.0 m

Static load upper deck: 500 kg/m²

Static load lower deck: 250 kg/m²

Dynamic load upper deck: 250 kg/m²

Dynamic load lower deck: 250 kg/m²

Total lifting height: approx. 2.0 m

Speed: 0.01 – 0.1 m/s, adjustable and frequency controlled

Accuracy: +/- 2 mm

* + 1. Orchestra Lifts 2

Technical Data

Quantity: 1 pcs.

Type of platform Double Deck

Type of drive: Lifting column Spiralift 6x18”

Positioning system: Encoder on drive train

Power supply on platform: Cable Chain (power + data cable)

Platform dimensions: approx. 23.0 x 2.8 m (width x depth)

Area: approx. 64 m²

Height between double deck: approx. 2.0 m

Static load upper deck: 500 kg/m²

Static load lower deck: 250 kg/m²

Dynamic load upper deck: 250 kg/m²

Dynamic load lower deck: 250 kg/m²

Total lifting height: approx. 6m

Speed: 0.01 – 0.1 m/s, adjustable and frequency controlled

Accuracy: +/- 2 mm

1. Chamber theatre
   1. Upper Stage Equipment
      1. Fly Bars

Technical Data

Quantity: 38 pcs.

Type of drive: electromechanical wire rope winch

Length of bar: approx. 18 m (+ 1m extensions on both sides)No. of lifting ropes: 4 pieces

Lifting Height: approx. 11.8 m

Payload: max. 500 kg

Point load: 200 kg (under wire rope)

Lifting Speed: 0.01 - 1.0 m/s

Acceleration: max. 1.0 m/s²

* + 1. Lighting Bars - use of 9 flybars

Technical Data

Quantity: 7 pcs. to be mounted on 3 flybars (>2.1.1) each

Type of drive: electromechanical wire rope winch

Type of bar: 3P-Truss 290-3

Length of truss: approx. 18 m

No. of lifting ropes: 4 pieces

Lifting Height: approx. 11.8 m

Payload: max. 3 x 500 kg (without flexible cable)

Self-weight flexible cable: approx. 1 x 200 kg

Point load: 200 kg (under wire rope)

Lifting Speed: 0.01 – 0.3 m/s

Acceleration: max. 0.1 m/s²

* + 1. Panorama Bars outer

Technical Data

Quantity: 2 pcs.

Type of drive: electromechanical wire rope winch

Length of bar: approx. 11,5 m

No. of lifting ropes: 4 pieces

Lifting Height: approx. 11.8 m

Payload: max. 500 kg

Point load: 200 kg (under wire rope)

Lifting Speed: 0.01 - 1.8 m/s

Acceleration: max. 1.2 m/s²

* + 1. Panorama Bars inner

Technical Data

Quantity: 2 pcs.

Type of drive: electromechanical wire rope winch

Length of bar: approx. 11,5 m

No. of lifting ropes: 4 pieces

Lifting Height: approx. 11.8 m

Payload: max. 500 kg

Point load: 200 kg (under wire rope)

Lifting Speed: 0.01 - 1.8 m/s

Acceleration: max. 1.2 m/s²

* + 1. Sound Curtain

Technical Data

Quantity: 1 pcs.

Type of drive: electromechanical wire rope winch

Type of opening: German style

Length of bar: approx. 18 m

Curtain separation: 300 mm (to main curtain)

No. of lifting ropes: 6 pieces

Lifting Height: approx. 11.8 m

Payload: max. 500 kg

Point load: 150 kg (under wire rope)

Lifting Speed: 0.01 - 1.5 m/s

Acceleration: max. 1.0 m/s²

* + 1. Main Curtain (bi-parting)

**Technical Data**

Quantity: 1 pcs.

Type of drive: electromechanical wire rope winch

Type of opening: Greek style

Type of bar: Curtain track beam with trolleys (wheeled runners)

Length of curtain track: approx. 18 m

Overlap of curtain halves: 0.5 m

Travel way: approx. 8.0 m each side

No. of ropes: 2 pieces

Payload: max. 500 kg (curtain weight)

Speed for opening/closing: 0.01 - 1.0 m/s each side

* 1. Lower Stage Equipment
     1. Orchestra Lifts 1

Technical Data

Quantity: 1 pcs.

Type of platform Single Deck Platform

Type of drive: Spindle drive with scissor system

Positioning system: Encoder on drive train

Platform dimensions: approx. 6.0 x 5.25 m (width x depth)

Area: approx. 31.3 m²

Platform height (retracted): 300 mm

Static load: 500 kg/m²

Point load: 300 kg / 20x20cm

Dynamic load: 150 kg/m²

Total lifting height: approx. 2 m

Speed: 0.01 – 0.03 m/s

Accuracy: +/- 2 mm

* + 1. Orchestra Lifts 2+3

**Technical Data**

Quantity: 2 pcs.

Type of platform Single Deck Platform

Type of drive: Spindle drive with scissor system

Positioning system: Encoder on drive train

Platform dimensions: approx. 4.3 x 5.16 m (width x depth)

Area: approx. 18.6 m²

Platform height (retracted): 300 mm

Static load: 500 kg/m²

Point load: 300 kg / 20x20cm

Dynamic load: 150 kg/m²

Total lifting height: approx. 2 m

Speed: 0.01 – 0.03 m/s

Accuracy: +/- 2 mm

1. Additional equipment
   1. Main stage
      1. Lighting storage units
      2. New floor decking

Technical Data

The new decking should apply to all the spaces around the stage(storage, side stages, backstage) and also the main stage

* + 1. Moveable portal towers – friction drive

Technical Data

New construction, movement operated directly on tower and main control unit

* + 1. New technical grid
    2. New main stage galleries
  1. Chamber stage
     1. Harlequin™ liberty switch

Technical Data

Area: 12x22 m +3x17 m

* + 1. New floor decking
    2. New technical grid
    3. New stage galleries

All additional information will be provided if needed