



**willis &  
thornley ltd**

A company of **Jeremias** Group

# INDUSTRIAL FREESTANDING CHIMNEYS

Design, Engineering and Production of freestanding  
chimneys and exhaust systems for the industrial sector

[www.wt-engineering.com](http://www.wt-engineering.com)



More than 45 years

## Manufacturing and innovation

Regarded as One of the longest standing Names in the UK for Design, Manufacture and install of Steel chimneys and fabricated products in carbon steels and stainless steels. Willis and Thornley Ltd were Founded in 1974 and in 2018 became part of the Jeremias Group.

**JEREMIAS**, is an industrial group with its headquarters based in Germany with over **40 years of experience** in design, production and development of solutions for the exhaust of gases. Jeremias is the technology leading manufacturer of factory-made exhaust systems, industrial stacks and freestanding chimneys.

From the very beginning the **industrial group Jeremias** has steadily grown being today a global player with its presence in more than 60 countries and with **8 production plants** around the world (Europe and North America), with more than 1200 staff members

**Willis and Thornley Ltd and Jeremias Group** offers technical support during all the different project stages; providing system design, back pressure calculations, fire rating, the required material specifications and installation drawings in various formats including BIM REVIT.



Sales Network in  
60 countries



More than 100.000  
referencias



8 production  
plants



More than 1400  
staff members

## Our professional Team

is committed to help you in your daily work with a customer service department always at your service.



[www.wt-engineering.com](http://www.wt-engineering.com)  
[sales@wt-engineering.com](mailto:sales@wt-engineering.com)





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## Industrial Engineering

In addition to the wide range of factory-made stainless-steel modular chimney and exhaust systems, Jeremias presents “Willis and Thornley Ltd Industrial division”, an exclusive department focused on providing engineering solutions for the exhaust at industrial facilities.

Willis and Thornley Ltd Industrial division offers sizing calculations, 3D and 2D design, manufacturing and installation of freestanding chimneys steel stacks and windshields for all types of industrial exhaust installations.

Willis and Thornley Ltd Industrial division is the ideal engineering partner for the industry offering a comprehensive service by highly qualified professionals in the field of smoke and gas exhaust, having all the necessary software tools to provide the expected technical support in industrial projects.

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### Steel Structures



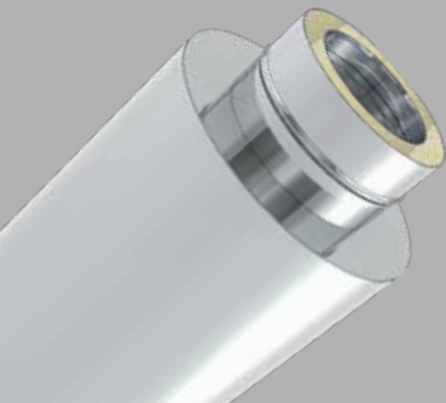
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### Industrial chimneys



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### Silencers



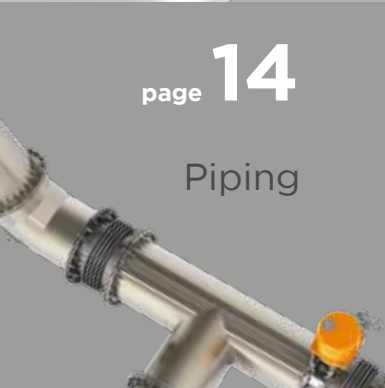
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### Construction Details



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### Piping



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### Ventilation Towers



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### References Certification, Quality and Standards



# INDUSTRIAL FREESTANDING CHIMNEYS



## SERIE FSA

*Double wall insulated  
inner pipe and load  
bearing external stack  
"Windshield"*

### Application

Combined cycles,  
cogeneration, boilers, Gen  
sets, chemical extractions,  
Biomass...

### Anchoring system:

Base flange or anchoring cage

### Bearing element:

Outer tube

### Exhaust pipe

AISI 304 / AISI 316

### Insulation

A1 - Rock wool  
A2- Mineral wool  
30, 50, or 100 mm thickness

### Internal back ventilation

along the complete system

### External stack

S235 / S275 / S355 / AISI 304

### Inner pipe number

1

### Finishing

RAL painted  
different cladding options  
stainless steel bright  
annealed / mat /  
galvanised steel



## SERIE FSA-X

*X- Double wall insulated  
inner pipes and load  
bearing external stack  
"Windshield"*

### Application

Combined cycles,  
cogeneration, boilers, Gen  
sets, chemical extractions,  
Biomass...

### Anchoring system:

Base flange and/or anchoring  
cage

### Bearing element:

Outer tube

### Exhaust pipe

AISI 304 / AISI 316

### Insulation

A1 - Rock wool  
A2- Mineral wool  
30, 50, or 100 mm thickness

### Internal back ventilation

along the complete system

### External stack

S235 / S275 / S355 / AISI 304

### Inner pipe number

≥ 2

### Finishing

RAL painted  
different cladding options  
stainless steel bright  
annealed / mat /  
galvanised steel

# JEREMIAS INDUSTRIAL GROUP



## Service

Study of the specific requirements  
Site survey including access restrictions  
Calculation of diameters, thicknesses, materials.  
Feasibility study & cost estimation. Continuous communication with the client.  
Quote follow up.



## Calculations

Static calculation.  
Report of loads at critical points.  
Resonance frequency calculation.  
Seismic calculations.



## Design 2D/3D

Transport drawings / design  
Anchor cage drawing  
list of materials required  
Production drawings.



## Production

Longitudinal welding - Laser cut, - plasma.  
Bending machines, large diameters, special pieces.



## Logistic

Transport organization.  
Crane and installation  
project coordination.



## Installation

Site surveys.  
Qualified installation teams,  
Supervision. and commissioning,  
Tracking deadlines



### SERIE FSB

*Double wall insulated chimney  
stack with internal load  
bearing pipe  
"Freestanding Chimney"*

#### Applications

Big boilers, chemical extract,  
industrial ovens...

#### Anchoring system:

Base flange or anchoring cage

#### Bearing element

inner pipe

#### Exhaust pipe

AISI 304 / AISI 316  
S235 / S355 / S275

#### Insulation

A1 - Rock wool  
A2- Mineral wool  
30, 50, or 100 mm thickness

#### External pipe

Cladding AISI 304 or  
AISI 316, aluminium  
galvanised steel

#### inner liner number

1

#### Finishing

RAL painted  
different cladding  
options stainless steel  
bright annealed /  
mat / galvanised steel



### SERIE FSC

*Stainless steel single wall  
ventilation tower*

#### Applications

Air exhaust / intake  
Ventilation and air conditioning

#### Anchoring system:

Base flange load

#### Bearing element

Single wall duct

#### Exhaust pipe

AISI 304 / AISI 316

#### Finishing

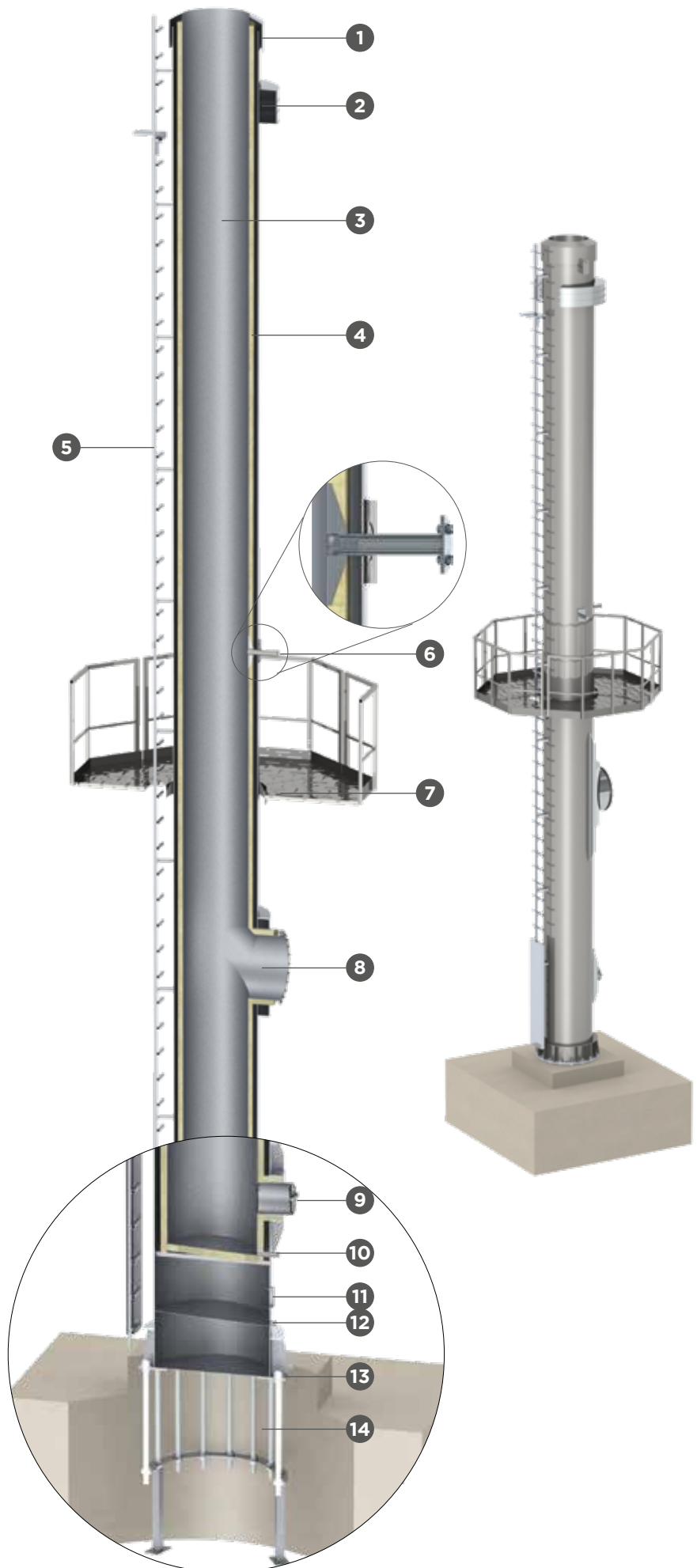
RAL painted  
stainless steel bright  
annealed / mat /

## SERIE FSA

*Freestanding Industrial chimney with double wall insulated inner liner and load bearing external stack "Windshield"*

*The inner gap between the insulated inner pipe and the outer stack guarantees a constant back ventilation along the system, avoiding the outer pipe reach the structural temperature limits*

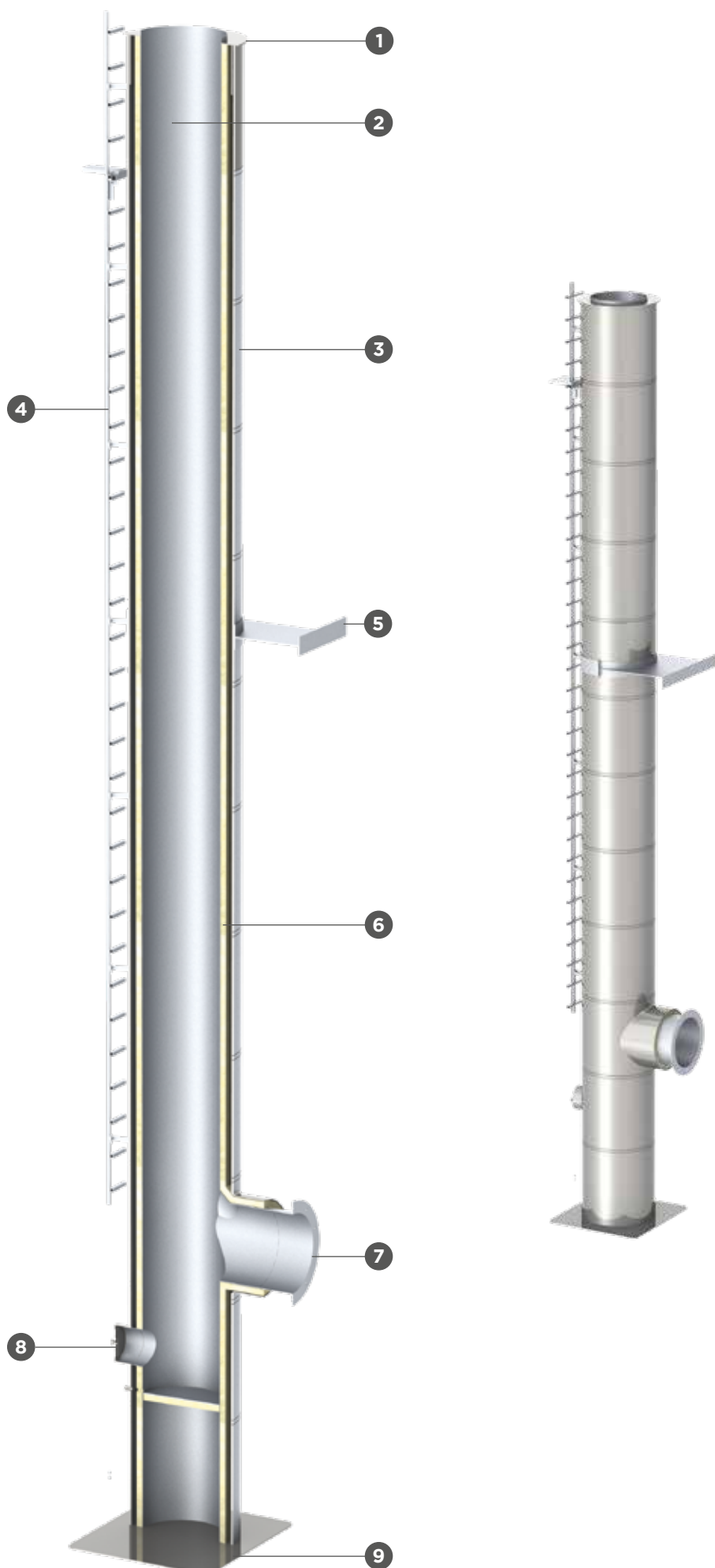
- 1 Terminal**  
Allows back ventilation along the complete system
- 2 Vibration damper**  
Reduces the impact of oscillations, guaranteeing the stability of the chimney.
- 3 Exhaust inner liner**  
Material: AISI 316, AISI 304.  
Thickness: 1.5 - 2 - 3 mm.
- 4 Insulation**  
High density rockwool with galvanized wire.  
Thickness: 30 to 100 mm, depending on the temperature.
- 5 Ladder**  
Single rail ladder / safety cage ladder with intermediate platforms.
- 6 Sampling points**  
Allows the connection of measuring equipment for maintenance requirements
- 7 Platform**  
In angle from 135° to 360°  
width from 800 to 2500 mm.  
Manufactured in steel S235JR galvanised, other material options available
- 8 T-Branch**  
Flanged connection or connection to Jeremias modular systems
- 9 Clean out opening**  
access for inspection and maintenance. Ø250, Ø600 mm, different door options
- 10 Inner pipe drain**  
Sloped base plate to allow removal of inside condensates
- 11 Back ventilation**  
Ventilation grill to allow a continuous inside air flow from base till top.
- 12 Outer pipe drain**
- 13 Base flange**  
With reinforcements
- 14 Anchor cage**



## SERIE FSB

*Double wall insulated chimney stack  
with internal load bearing pipe  
"Freestanding Chimney"*

- 1 Open Terminal**
- 2 Exhaust inner liner**  
Material: AISI 316, AISI 304,  
S235, S275, S355
- 3 External cladding**  
Material: AISI 316, AISI 304,  
Aluminium, other options  
Thickness: 0.8 - 1.5 - 2 mm.
- 4 Ladder**  
Single rail ladder / safety cage  
ladder with intermediate  
platforms.
- 5 Wall support/bracket (optional)**  
Helps reducing the total loads and  
the thickness of the structural  
tube and foundation.
- 6 Insulation**  
High density rockwool with  
galvanized wire.  
Thickness: 30 to 100 mm,  
depending on the temperature.
- 7 T-Branch**  
Flanged connection or connection to  
Jeremias modular systems
- 8 Clean - out opening**  
Access for inspection and  
maintenance. Ø250, Ø600 mm,
- 9 Base flange**





## SERIE FSA-X

*Freestanding Industrial chimney with multiple double wall insulated inner liners and load bearing external stack "Windshield"*

*The inner gap between the insulated inner pipe and the outer stack guarantees a constant back ventilation along the system, avoiding the outer pipe reach the structural temperature limits*

- 1 Terminal**  
Allows back ventilation along the complete system
- 2 Exhaust inner liners**  
Material: AISI 316, AISI 304, S235, S355  
Thickness: 1.5, 2.3 mm.
- 3 Insulation**  
High density rockwool with galvanized wire.  
Thickness: 30 to 100 mm, depending on the temperature.
- 4 Platform**  
in angle from 135° to 360°.  
width from 800 to 2500 mm.  
Manufactured in steel S235JR galvanised, other options available
- 5 T-Branch (two or more)**  
Flanged connection or connection to Jeremias modular systems
- 6 Clean out opening**  
access for inspection and maintenance.  
Ø250, Ø600 mm, different door options
- 7 Inner pipe drain**
- 8 Back ventilation**  
Ventilation grill to allow a continuous inside air flow from base till top.
- 9 outer pipe drain**
- 10 Base flange**  
with reinforcements
- 11 Anchor cage**





## STEEL & LATTICE STRUCTURES

Steel structures and lattice masts to support Jeremias modular exhaust systems (DW-ECO, DW-KL ...). These mast-supported solutions are sometimes the ideal solution in projects where ground anchoring or access is restricted. The time and place flexibility for the installation is the biggest advantage of these solutions.

The structures can be design in a modular way for better transportation and logistics inside the construction site.

### Project features

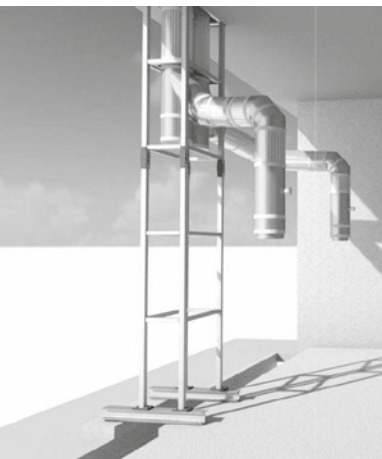
Static calculation of the structure according to building regulations. Project study in phases depending on the area, construction site, specific needs...

#### Construction details:

Anchoring with concrete foundation and/or base plate

Steel profiles: IP, HEB, circular / square, in L...

Materials: S235JR, S275JR, galvanised steel, AISI 304, AISI 316...



#### Lifting lugs

Pre-assembled structure in factory or on site.

Modular exhaust systems can be installed on the mast at the factory or on site depending the needs of the client

### Additional Options

Platform for sample points

Cage or rail ladder.

Lightning rod

Beacon lights.

RAL painted finishing, glossy, matte ...

Special treatments depending on the area (C3, C4, C5)

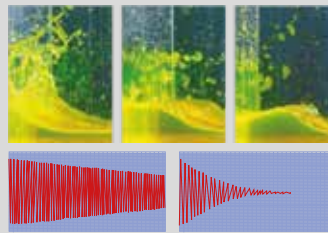


## CONSTRUCTION DETAILS



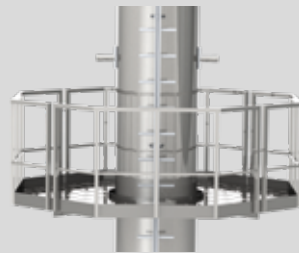
**Open terminal:** It allows the expansion of the inner tube and the internal back ventilation of the chimney.

**Vibration damper:**  
Due to the effect of the wind, it is recommended to use a vibration damper. The oscillations are damped by the internal movement of the liquids placed in chambers.



Oscilations without vibration damper

Oscilations with vibration damper



**Platform**  
for access to the sampling nozzles  
Made of galvanized S235JR steel with tramex floor. Railing, dimensions and angles according to the specific needs.

**Ladder**  
Single rail ladder / safety cage ladder with Ø700 mm. different options.



**Sampling points and nozzles**  
nozzles for connection of sampling and inspection equipment normally installed at 1.5 m high with respect to the platform and at 5 x Ø int. of the horizontal smoke connection.



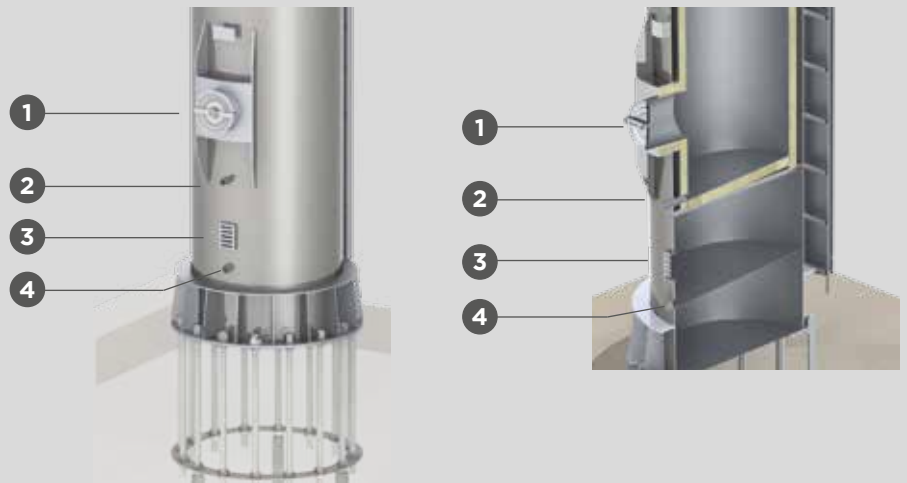
**Chimney in several sections**  
When the chimney is manufactured in several sections due to the length or special requirements, each section is joined by bolts flanged both the inner and outer pipe

this way the tightness and structural union is granted



**Chimney base details**

- 1** Clean out opening.
- 2** Inner drain.
- 3** Back ventilation.
- 4** External pipe drain.

**T-Branches**

45°

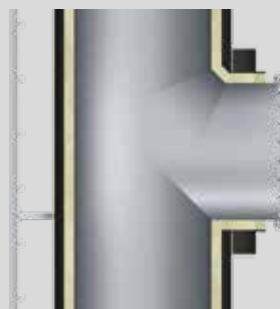


45°

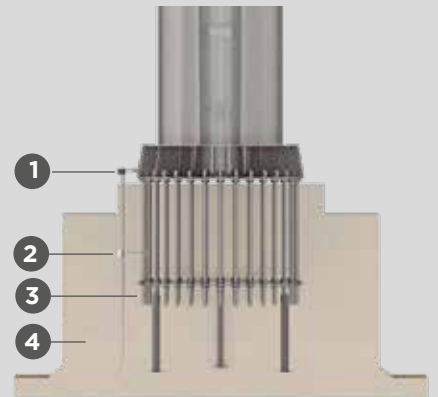
Different connection angles depending on the needs of the installation.  
Flanged connection or to modular Jeremias exhaust , systems etc.  
External protection jacket to cover welds and close the connection.



90° / 87°



90° / 87°

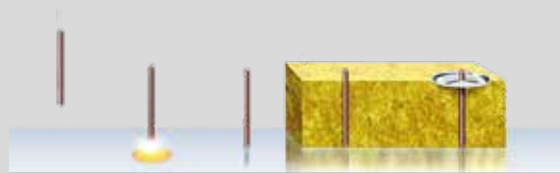
**Anchoring cage**

Double centering ring with anchor bolts.  
It is supplied prior to the chimney, to install into the concrete foundation

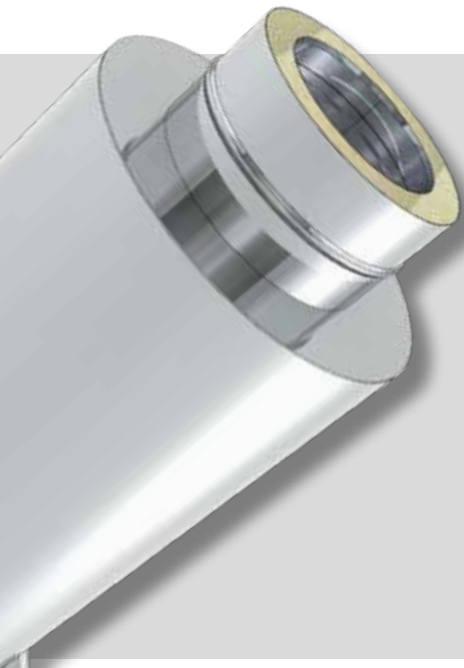
- 1** Earthing plug
- 2** Connection to the Earthing plug
- 3** Anchoring cage
- 4** Concrete foundation

**Insulation fixing**

Insulation fixing with steel plate and pins welded to the inner tube. Through this system, a correct fixing of the insulation is ensured as well as the continuous insulation along the entire vertical.

**EXTERNAL SURFACE TREATMENTS FOR THE OUTER STACK**

C3	Moderate	Low pollution areas, and less aggressive environments. Production areas with average humidity levels, and residential areas.
C4	High	Pollution zones and medium aggressive environments. Chemical environments and pools.
C5	Very high	Coastal areas with high humidity levels, aggressive industrial environments, continuous condensation, and areas with high pollution.



## SILENCERS

# Willis & Thornley Ltd Industrial Division Noise Control Solutions

Many facilities using biomass, diesel or gas, situated close to residential areas can generate annoying noise during operation. The noises that are generated in their different frequency ranges require a specific treatment for their attenuation avoiding possible discomfort and meet the local noise requirements.

Willis & Thornley Ltd Industrial Division develops the most appropriate solutions for noise attenuation and control, Our R&D engineering team ensures the most suitable solution for each installation using our in-house testing bench.

### WILLIS & THORNLEY LTD INDUSTRIAL FEATURES

- **Big product range of standard solutions.**
- **Special fabrication:**
  - On site noise measurements.
  - Complete study including the exhaust system design.
  - Personalized advice depending on the type of application.
  - Specific design.
  - Complete installation of the demanded solution.

### MATERIALS

304, AISI 316,  
polypropylene, PPS

### FINISHING

shiny, matt, RAL painted

### ATTENUATION MATERIAL

Combination of high density mineral wools

### AVAILABLE DIAMETERS

Standard from Ø130 to Ø 600  
bigger diameters under request

### FEATURES

TIG/LASER welding  
horizontal / vertical installation

## WILLIS & THORNLEY LTD STANDARD SILENCERS

### Absorption Silencers

These passive silencers use porous material such as mineral wool to achieve attenuation, mainly in the medium and high frequency range. Any acoustic energy is absorbed by friction effects on the wool and transformed into heat.



#### Modular absorption silencer

##### ASE - ECO

Base attenuation 15 o 25 dB  
T max: 2000C  
P max: 200 Pa  
wet conditions



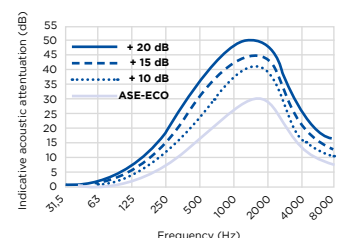
+

#### EXTENSIBLE

Possibility of increasing the attenuation by adding one of these 3 modules.



- 10 dB  
- 15 dB  
- 20 dB

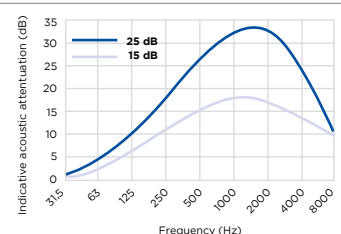


#### Absorption Silencers DW

**ASD-B DW:** P: 200 Pa, wet

**ASD-DW:** P: 40 Pa, dry

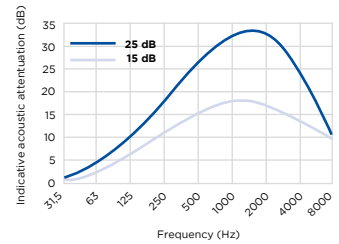
15 o 25 dB attenuation  
connection DW-ECO Jeremias  
T max: 200°C



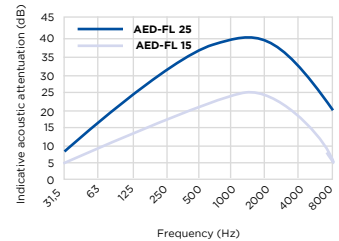


**Absorption silencer EW****ASD-B EW:** P: 200 Pa, wet**ASD-EW:** P: 40 Pa, dry

15 o 25 dB attenuation  
 standard connection EW-ECO Jeremias  
 T max: 200°C

**Flanged absorption silencer AED-AEL**Aligned flanges **AED**L - Flanges **AEL**

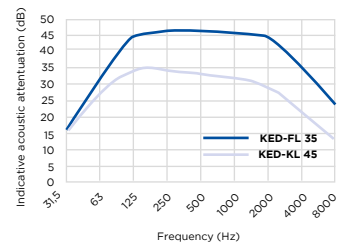
20 o 30 dB attenuation  
 T max: 600°C  
 P max: 5000 Pa  
 Suitable for wet conditions  
 conical KL connection as an option

**Combined silencers**

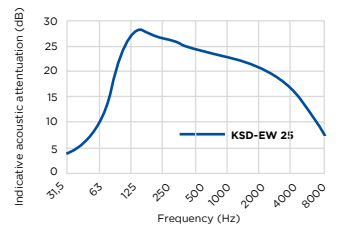
This type combines absorption silencers with several resonance chambers for the additional attenuation of lower frequencies. Each of the chambers are responsible for filtering out a specific frequency range, which leads to broadband attenuation of the noise.

**Combined Silencer with flanges**Aligned flanges **KED**L - Flanges **KEL**

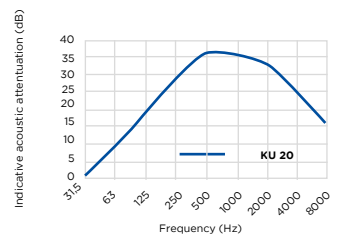
20 o 45 dB attenuation  
 T max: 600°C  
 P max: 5000 Pa  
 Suitable for wet conditions  
 conical KL connection as an option

**Combined silencer****KSD-B:** P<sub>máx</sub>: 200 Pa, wet**KSD-EW:** P<sub>máx</sub>: 40 Pa, dry

25 dB de Attenuation

**Combined Silencer KU**

35 dB de attenuation

T<sub>máx</sub>: 600°CP<sub>máx</sub>: 5000 Pa**Noise Insulating Cores**

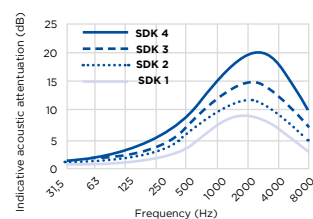
Noise insulating cores are predominantly designed for retrofitting in chimneys and contribute to effectively reducing noise peaks according to the principles of absorption. They are suspended from above and therefore very easy to install.

**Noise insulating core SDK**

5, 8, 10, 15 dB Attenuation

Installation in existing chimney / duct

Length in accordance with the level of  
 attenuation L: 1000, 1500, 2000, 3000 mm



## PIPING

### Connecting pipes

Willis & Thornley Ltd offers different connecting pipes, welded or flanged on-site or pre-fabricated modular systems to connect the equipment outlet to the Industrial chimney. Due to specific requirements of the industrial process, the connecting pipe may contain numerous changes of direction, points for sampling, clean-out openings, drains, compensators, valves etc. After a site survey or according to the project drawings Jeremias Industrial Division designs the ideal solution for each specific project including all necessary accessories.

The whole process; calculation, design, manufacturing and assembly are controlled by a single company, avoiding possible coordination error.

## MODULAR CONNECTING PIPE

### DW-ECO

#### MATERIAL

AISI 304 / AISI 316 / GALVA

#### FINISHING

Bright annealed, mat, powder coated RAL

#### INSULATION

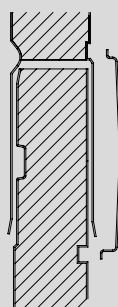
High density rigid mineral wool (120kg/m<sup>3</sup>) thickness from 25 to 100mm

#### S. STEEL THICKNESS

from 0.4 mm to 1.5 mm

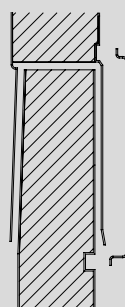
#### AVAILABLE DIAMTERS

Ø80 a Ø 1000 mm



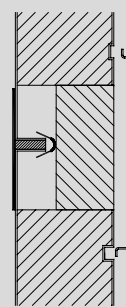
Male-Female push fit connection secured by locking band 2.0

### DW-KL

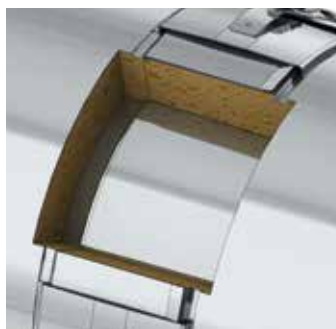


Conical Male-Female push fit connection secured by locking band 2.0

### DW-FS



Flange connection secured by internal V-band and locking band 2.0 in the external



## WELDED CONNECTING PIPES

### MATERIAL

AISI 304 / AISI 316 / GALVA

### FINISHING

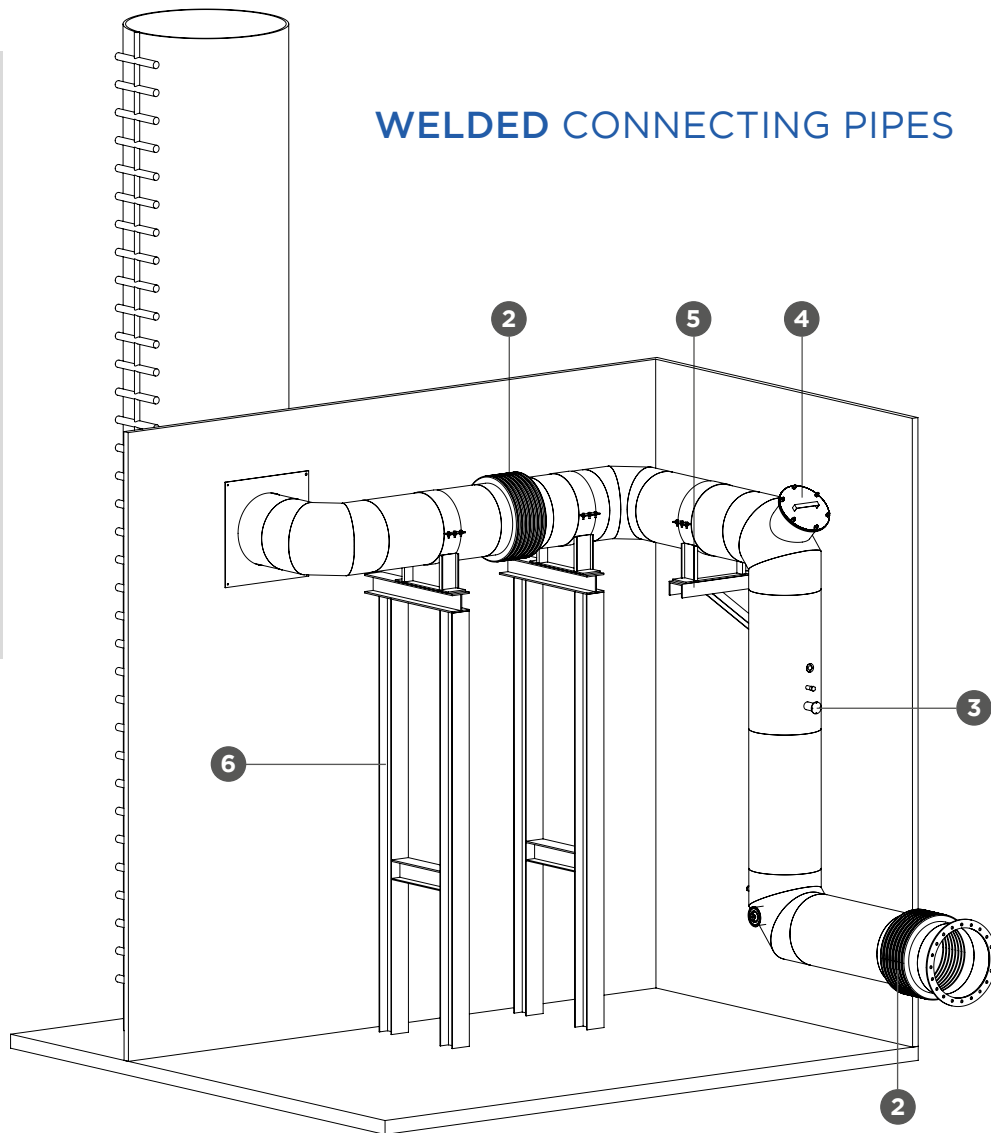
BA, mat, powder coated RAL

### STEEL THICKNESS

From 0.5 to 6 mm

### AVAILABLE DIAMETERS

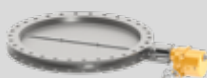
80 to 2000 mm



### 1 Dampers/Valves



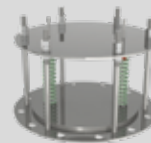
Manual damper  
with safety lock



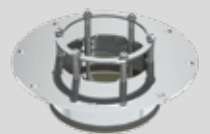
Motorised damper



Motorised damper with  
security return system in  
case of power failure



Explosion relief valve



Implosion relief valve

### 2 Expansion bellows



### 3 Sampling points



### 4 Clean out openings



### 5 Wall supports



### 6 Custom made metal structures



## VENTILATION TOWERS FSC

*Ventilation Towers manufactured in single wall stainless steel, for both expulsion and air discharge.*

### TERMINAL WITH LOUVRES

- 1** Top cap
- 2** Opening from 180° to 360°
- 3** Bright annealed or polished stainless-steel ducting
- 4** Base plate

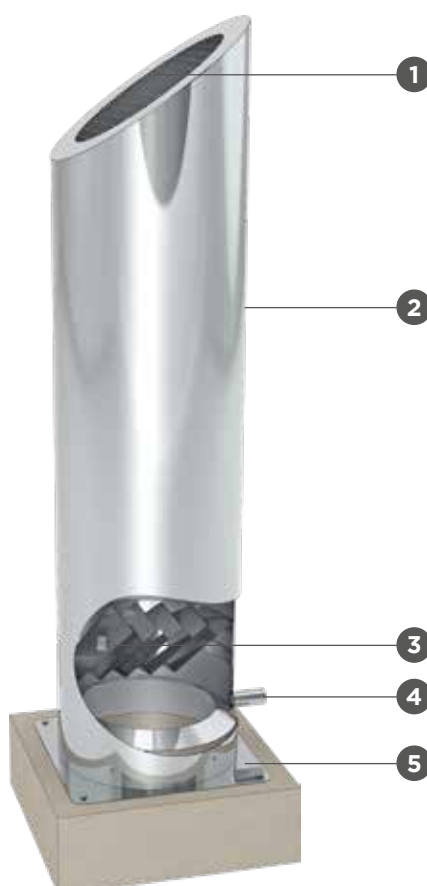
### OPEN TERMINAL

- 1** Mesh
- 2** Bright annealed or polished stainless steel ducting
- 3** Water collector
- 4** Drain
- 5** Base plate

### TERMINAL WITH LOUVRES



### OPEN TERMINAL



### TYPES OF TERMINALS



0°

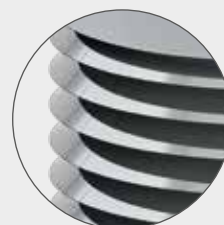


With slope 3-45°

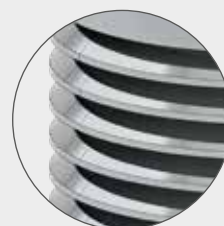


Conical 3-30°

### LOUVRES



45° at edge



45° folded edge





Through CE certificates and factory quality control, Willis & Thornley Ltd grants the proper chimney operation and durability on each specific project

”

Willis & Thornley Ltd products are subject to strict quality controls to ensure proper operation and durability

CE UK  
CA

## Certifications

- Certificates according to current regulations
  - CE standard for industrial chimneys EN 13084-7
  - CE standar EN 1090-1 for steel structures.
- Statics in accordance with the Eurocódigo.
- Seismic and wind calculations according to the specific region.

## Quality

- Raw materials control
- Quality monitoring through along production
  - Welding control with penetrating liquids
  - Controls and dimensional tolerances
  - Qualified welders using certified welding processes
- Finishing Control:
  - Paint layers
  - Polished, shot blasting, pickling

## Our **experience** speaks for itself

The wide variety of our product range, has allowed us to be present for and collaborate in important commercial and industrial projects, together with leading mechanical & electrical companies and in very diverse sectors in continuous coordination with large engineering companies, architecture studios and big developers.

Special Vent London



Anabolic Digestion Plant Newcastle



Francis Crick Institute London



Islay Malting Plant



Glen Ord Malting Plant





Scotland Biomass Plant



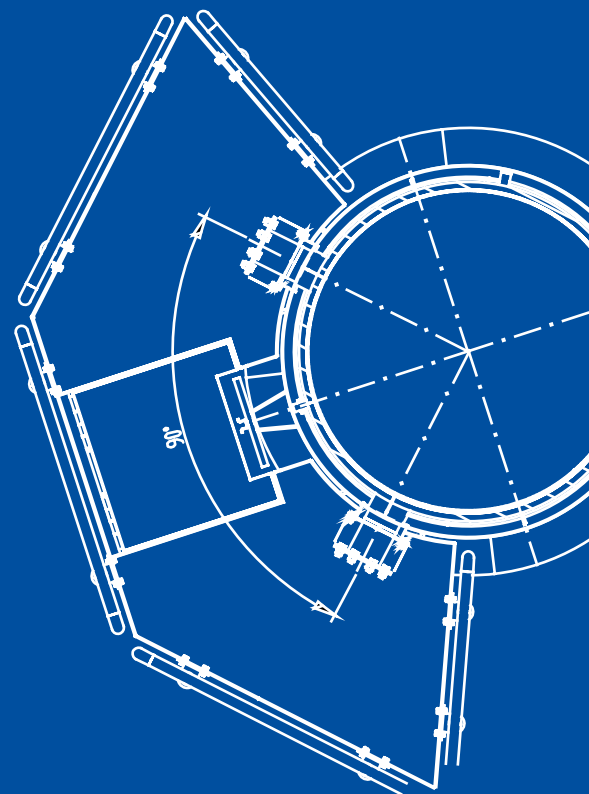
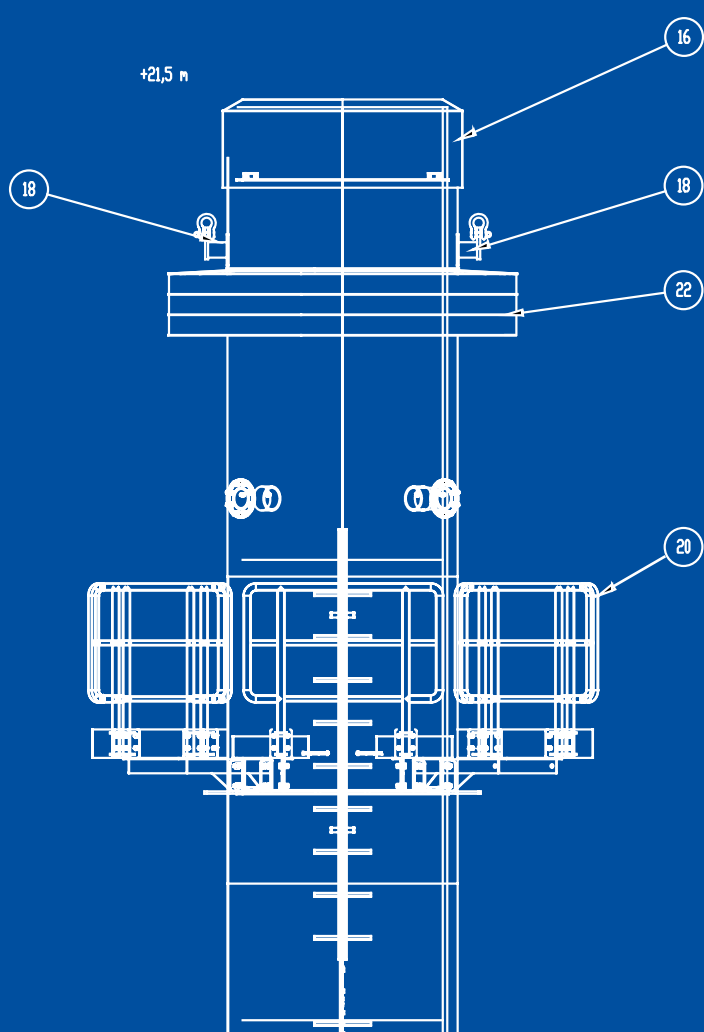
Liverpool Energy Centre



Aluminium Process Plant Jamaica



Energy Centre Newcastle



Argentina | Austria | Belarus | Belgium | Bulgaria | Brazil | China | Colombia | Croatia | Czech Republic | Denmark | Estonia | Finland | France | Germany | Greece | Hungary | Ireland | Italy | Japan | Kazakhstan | Latvia | Lebanon | Lithuania | Luxembourg | Malta | Mexico | Netherlands | Norway | Poland | Portugal | Qatar | Romania | Saudi Arabia | Serbia | Slovenia | South Africa | Spain | Sweden | Switzerland | Tunisia | Turkey | UK | Ukraine | UAE | USA



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