

HYDRAULIC DRILLING RIG

HH-200MM



QUALITY AND ENVIRONMENTAL MANAGEMENT
SYSTEM CERTIFIED IN COMPLIANCE WITH ISO
9001:2000 AND ISO 14001:2004



REDUCED ENVIRONMENTAL IMPACT

- Reduction of the working area
- Minor height of the mast
- Reduction of the noise
- System of mud collecting and canalization



ENHANCED SAFETY IN WORKING AREA

- Semi automatic sequences in the tubular movement
- Easier rig-up / rig down sequence
- Enhanced control of hydraulic movement
- Enhanced operator working control

LOWER COST

- Lower cost for moving
- Staff reduction
- Better and constant performance during drilling

HH-200MM

GENERAL DESCRIPTIONS

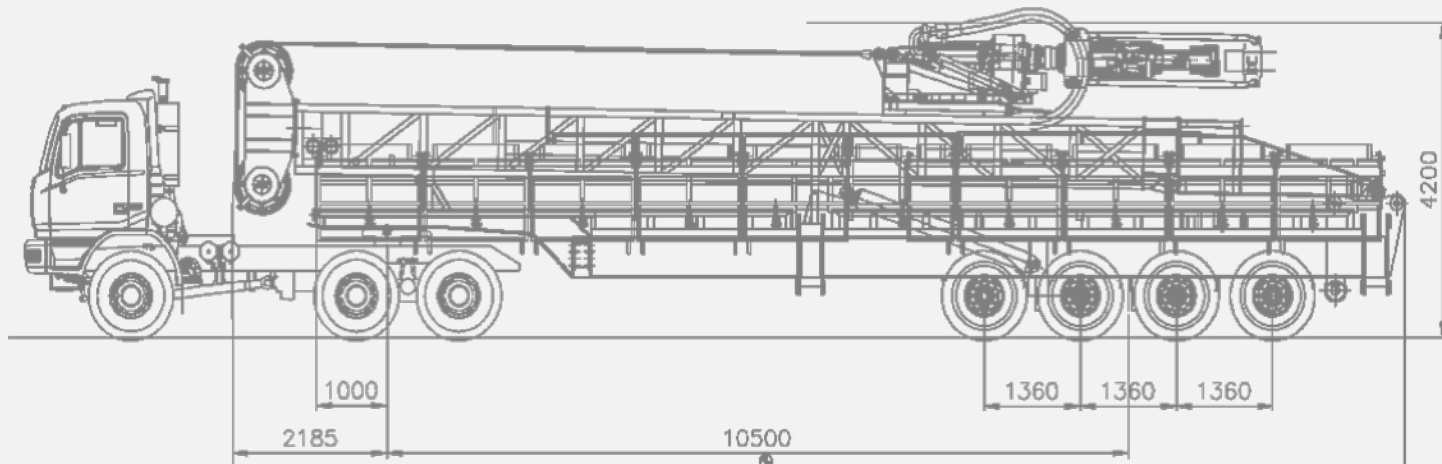
Static hook capacity	200 TONS (400,000 lb)
Hoisting power	1250 hp
Max torque	3600 kg x m (26,000 ft x lb)
Top drive rotation (rpm)	200 rpm
Mud pumps power	n° 2 mud pump 1000 hp each
Mud system capacity	280 m3
Generators power	2 x 545 Kw

- Fast moving,
- Trailer mounted
- Diesel Driven
- Integrated Top Drive System
- Integrated Pipe Handling System



HH-200MM

DESIGN & CONSTRUCTION CRITERIA



In accordance with API Specifications (mast & substructure, top drive, lifting equipment)

All construction in accordance with API recommended standards governing fabrication, welding, coating, storage, etc., of land drilling rigs.

Manufactured and certified in accordance with the applicable EC Directives

Certified in accordance with the ATEX 95 Directives

CE marked as per Directive 98/37/EC Annex IIA

Hazardous area classification according to API RP500

Climate temperatures from minus 20°C to plus 50°C

Electric equipment and devices in accordance with API RP 500 Class 1 Div 1 (3m / 10 ft radius around center well).



MAIN HYDRAULIC POWER UNIT

Independent HPU assembled in soundproof container, located on ground level composed with two blocks HPU (each one is independent) with following main specifications:

Total HPU installed power: 1250 HP

Q.ty two (2) diesel engines Caterpillar model C18ACERT-TTA (C-rating) 625 bHp continuous 1800 rpm;

Total oil tank capacity: 4,500 lt (1188 gal);

NOTE: both power units are connected to a “hydraulic compound system” in order to enable the drilling operation in case of damage to one unit, but at half speed rate.



HH-200MM

MAST



TELESCOPIC MAST

Telescopic mast, fabricated in compliance with API 4F, operating as a hydraulic hoist.

Static hook capacity: 200 tons (400,000 lbs)

Pull down capacity: 20 metric tons (44,000 lbs)

Designed to allow handling of API Range 3 drill pipes, and API Range 3 casings.

Four drilling lines 34 mm rope diameter with min breaking strength of 115.700 kgs each.

The mast is raised and lowered by two hydraulic jacks. Max. top drive speed: 1 m/sec (3 ft / sec)

Working stroke: 16 m (52ft 6in)

Passage trough substructure: 1,200 mm (47 1/4")

Distance between mast and well center: 800 mm (31 1/2")

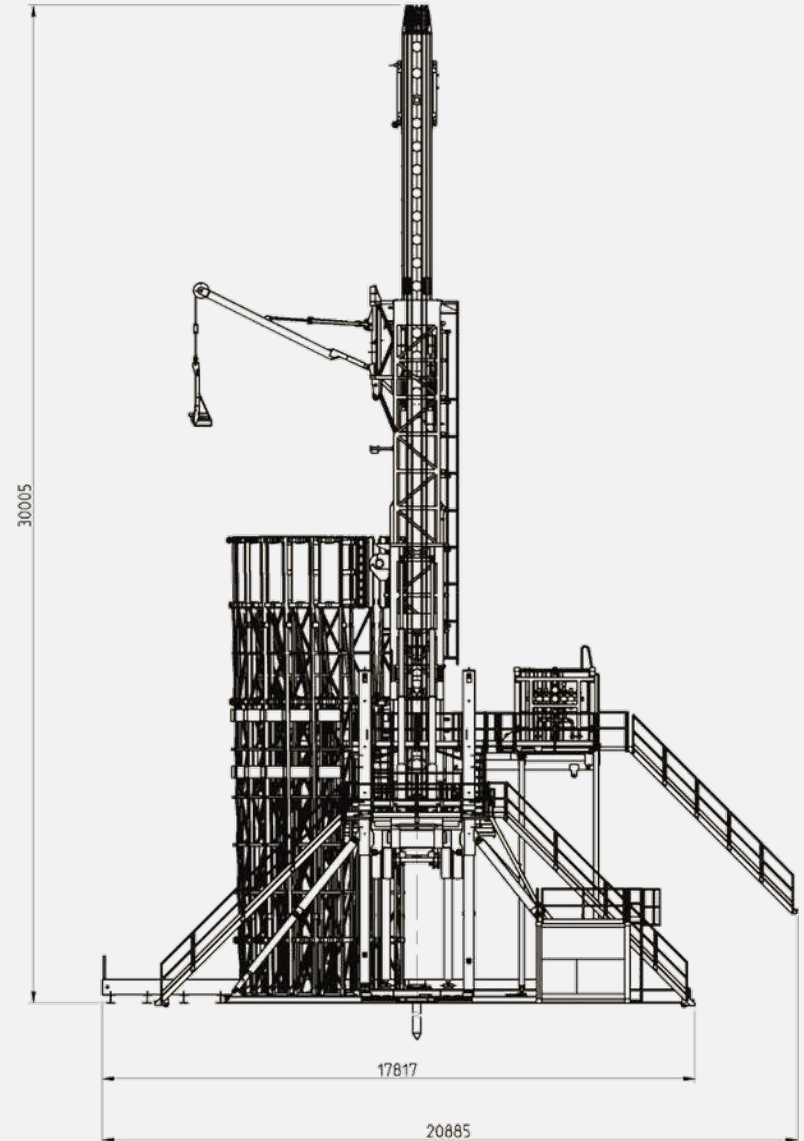
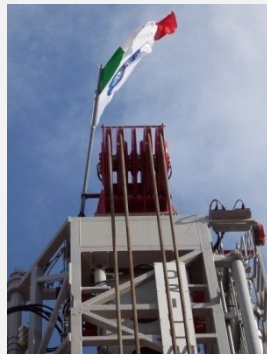
CROWN BLOCK

Q.ty eight (8) sheaves with hardened grooves for 34 mm (1-11/32") rope

Mounted on bearings.

Centralised Greasing System

Equipped with two additional sheaves for wire line services



HH-200MM

SUBSTRUCTURE

SUBSTRUCTURE & DRILLING FLOOR

fabricated in compliance
with API 4F,

API rated rotary load capacity	m/t 181
Rig floor dimension: m x m	m4 x m3
Rig floor height from ground level	m 7,6
Clear height between rotary beams and ground level	m 7,00

Complete with drains collecting system

Q.ty 14 Vertical pipe bins with total 196 pipes
Range 3 (total depth 2545 meters) – additional
bins available to reach 3.000meters depth



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TOP DRIVE

TOP DRIVE HTD 200

Driven by 4 top head hydraulic motors

ID full passage: 76 mm (3");

Max working pressure: 344 bar (5,000 psi).

Patented swing-out system to pick-up tubular on mousehole

E with a static brake operated from main control panel and c/w shock absorber.

Three speed built-in gear box

Floating and rotating double hook

Manual + Automatic IBOP 10,000psi WP

Performance as follows:

Torque range: from 0 to 3,600kg.m (26,500 ft.lb)

Variable speed: from 0 to 200 rpm

Max power: 295 kW (397 HP)

Max hoisting: 181,000 kg (400,000 lbs)

TORQUE WRENCH

Built-In for fast & safe make-up and break-out operations from 4 1/8 " to 8" OD.

Mounted underneath the power swivel and is composed of:

Max make-up torque: 5000 kg.m (36,200 ft*lbs)

Max break-out torque: 8000 kg.m(50,700 ft*lbs)



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TOP DRIVE

Casing Make Up Device

The device is located underneath top drive double hook with gripping patented tool, hydraulically operated from main control panel, which allows the casing rotation with adjustable torque, according to API specification. This device is specially designed to allow fluid circulation during casing running in order to avoid block and tackle with drilled hole wall. Suitable to operate casing 13.5/8", 9.5/8", 7" (other size available on request). It works with a set of link elevators 2.1/4" x 96" with load capacity of 250 tons.



HH-200MM

R.T. & CLAMP

Rotary table

Back-up Type Rotary table driven by two hydraulic motors

27 1/2" full opening c/w removable API master bushing

Removable to leave 47 1/4" free passage trough substructure

In compliance with API 7K Spec.

Max torque: 1,020 daNm (7,527 ft*lbs)

Max speed: 60 rpm



AUTOMATIC POWER SLIPS

Hydraulic operated Automatic Power Slips Assy

Utilizing conventional API DP slips.

Slips Range from 2.3/8" to 20"



HH-200MM

RIG FLOOR EQUIPMENT

PIPE HANDLING SYSTEM

Composed as follows:

Q.ty 1 hydraulic jib crane 6000kg capacity operated by wireless remote control

Q.ty 14 Vertical pipe bins with total 196 pipes Range 3 (total depth 2545 meters) – additional bins available to reach 3.000meters depth

POWER TONGS

Operated from main control panel

Max. torque: 17658 daNm (130,238 ft*lbs)

Make-up and break-out DP and DC from 3 1/2" to 11"

Electronic control of rotation for instrumentation.

Power tong suspended with hydraulic jack allowing floating vertical movement operated by a hydraulic cylinder.

BOP Handling System Inside the Substructure

Rated Hoist Capacity 40 tons

Hydraulic Counterbalance System for Manual Tong



MUD pump 9T1000

Q.ty 2 pumps brand Drillemec model 9T1000 7"x 9"
type

Rated input power 1000 hp

Driven by Caterpillar 3512 Fully

soundproofed Max combined flow:

more than 5000 lt/min Max working pressure: 5M psi

Full range of liners available Possibility to have

optional 3rd pump



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MUD LINES

Mud Pump Surcharging pump

BAKER SPD mud hog 2.5" 8"x6"x14"

Mud pump Discharge Lines flexible

section 3.1/2", 5,000 psi

API 7K.

Rig Floor mud Manifold

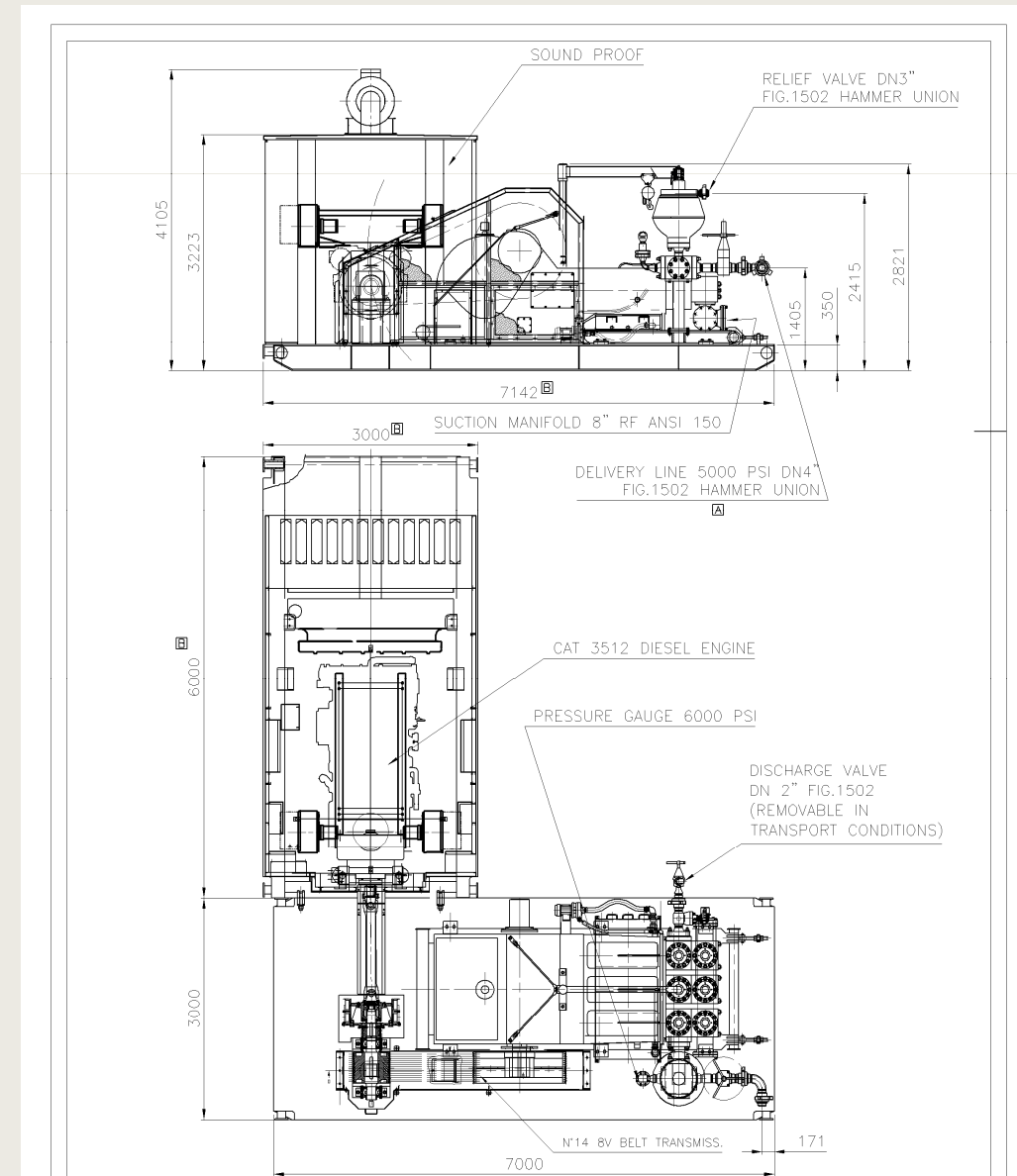
Valve 4.1/16" - 5k and 2.1/16" - 5k

2.1/16" - 5k

Bleed off Valve Flocon Adjustable Choke

Rotary Hoses 4" 5,000 psi API 7K

Stand Pipe 4" 5,000 API Spec 5L



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MUD SYSTEM

<i>Mud tanks Description</i>		Mud tank No.1	Mud tank No.2	Mud tank No.3	Mud tank No.4
<i>Mud tank capacity 240 m³</i>	m ³	63	57	60	60
<i>Divided in compartments</i>	No	4	2	2	2
<i>Capacity of each compartment</i>	m ³	10+3x12	28+29	28+29	28+29
<i>Mud tank dimensions (H-W-L)</i>	M	2.2x2.4x12,5	2.2x2.4x12,5	2.2x2.4x12,5	2.2x2.4x12,5
<i>Electric Agitator quantity</i>	No		1 each comp	1 each comp	1 each comp
<i>Electric Agitator make and type</i>	:		Swaco	Swaco	Swaco
<i>Electric Agitator driving motor</i>	HP		20	20	20
<i>Bottom guns installed quantity</i>	No	1 each comp	2 each comp	1 each comp	2 each comp
<i>Bottom guns size</i>	In	3	3	3	3

Drilling water total capacity	m ³	120 m ³
Quantity tanks	no	2
capacity of each	M ³	60 m ³
transfer pump	no	2 centr.



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MUD TREATMENT

Sand trap tank, 8 m³ capacity

Degasser unit SWACO horizontal

Mud gas separator DRILLMEC 48"

Trip Tank 8 m³

Shale shaker SWACO Mongoose

n° two shale shaker linear motion

screen available mesh:

20 40 60 80 100 120 140

Mud Cleaner SWACO MONGOOSE

Cones 4"x16" + 2 x 12",

feed pump 6"x8"x14",

screen available size Mesh:

20 40 60 80 100 120 140 200



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BOP SYSTEM

Diverter System

Bag preventer 21-1/4 x 2,000 psi
Bottom connection size 20-3/4 x 3,000 psi
Ball valve hydraulic 8-1000 2"1/16-5000
Built as per API 16A

Bag preventer 13"5/8 x 10,000 psi

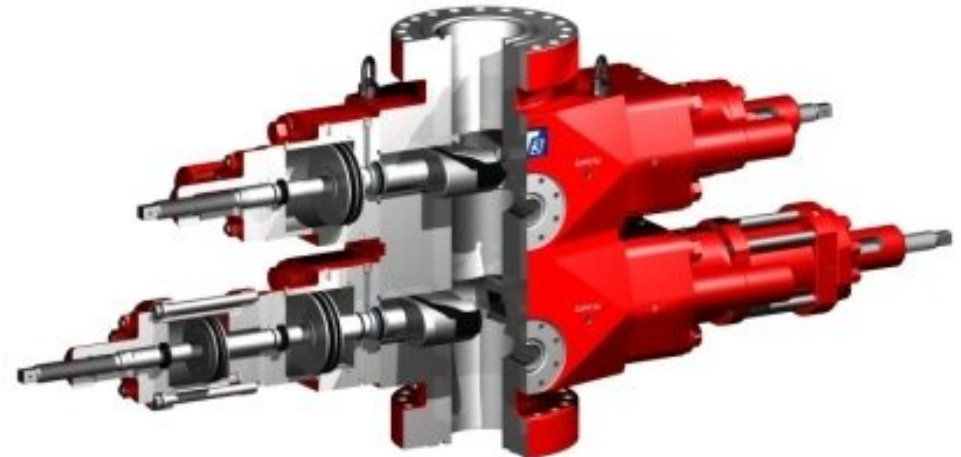
H2S service,
Top connection studded, 13"5/8 x 10,000 psi
Bottom connection Flanged, 13"5/8 x 10,000 psi
Built as per API 16A

Double RAM preventer 13"5/8 x 10,000 psi

H2S service,
Top connection studded, 13"5/8 x 10,000 psi
Bottom connection Flanged, 13"5/8 x 10,000 psi
Outlet 4-1/16
Built as per API 16A

Single RAM preventer 13"5/8 x 10,000 psi

H2S service,
Top connection studded, 13"5/8 x 10,000 psi
Bottom connection Flanged, 13"5/8 x 10,000 psi
Complete with shear rams
Built as per API 16A



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BOP SYSTEM

Choke Manifold 10,000 psi

H2S service, connection welded , built as per API 16C
High pressure section 3"1/16 x 10,000 psi with sensor mud logging unit,
Power adjustable choke 3"1/16 x 10,000 psi
Manual adjustable choke 3"1/16 x 10,000 psi
Lower pressure section 3"1/16 x 5,000 psi
Outlet to: mud gas separator, waste pit, flare lines, reverse circulating lines.
Power choke control panel on rig floor

Choke valve

Two choke valves, 4"1/16 x 10,000 psi
Built as per API 6A

Kill valve

Two kill valves, 2"1/16 x 10,000 psi
Built as per API 6A

Choke & kill line

Coflex 10,000 psi
H2S service,
Connection flanged 4"1/16 & 2"1/16 x 10,000 psi



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ACCUMULATOR UNIT

BOP control system

Oil reservoir capacity 350 gallons

20 bottles 11 gallons

N° 3 Air-driven recharging pump 150 psi

Electric pump recharging in 15 minutes

Number of Control Valves 9

16 BOP control hoses

Low/High pressure by-Pass valve

Annular Pressure regulator

Manifold Pressure regulator

Two Diverter control hoses

B.O.P. Driller's control panel

Graphic display of BOP configuration

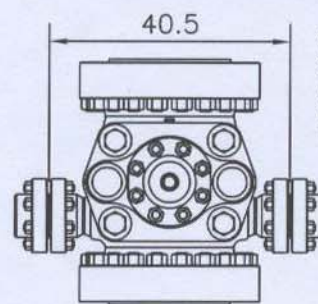
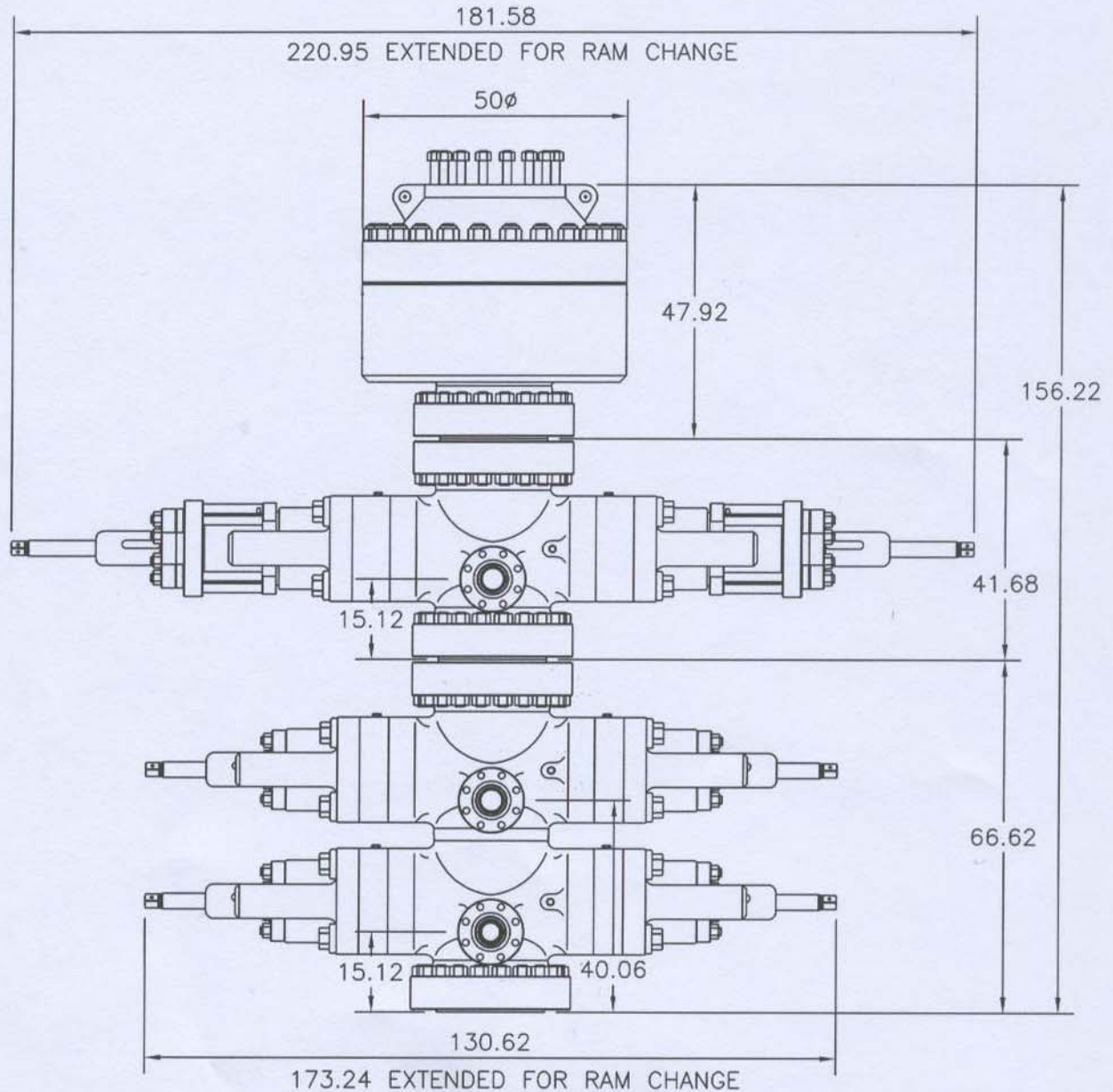
With Lights for activated functions

Explosion proof

Alarms at driller's site & tool pusher's site



BLOWOUT PREVENTER STACK UP ASSEMBLY
 13-5/8" BORE, TYPE 50 (U) RAM DOUBLE AND SINGLE BLOWOUT PREVENTERS,
 13-5/8" 100000 PSI W.P., 13-5/8" API 10000, BX-159 FLANGED END CONNECTIONS,
 SINGLE EQUIPPED WITH LARGE BORE SHEAR BONNETS AND SHEAR BOOSTERS,
 ALL WITH 4-1/16" API 10000, BX-155 FLANGED OUTLETS, WITH
 13-5/8" 5000 PSI W.P. TYPE 52 (SPHERICAL) ANNULAR, 13-5/8" API 10000,
 BX-159 FLANGED BOTTOM AND 13-5/8" API 5000, BX-160 STUDDED TOP



OUTLET DIMENSIONS
 SYMMETRICAL ABOUT
 CENTERLINE AND TYP.
 FOR DOUBLE BOP

APPROXIMATE WEIGHT: 46,770 LBS.
 (WITH RAMS INSTALLED)

5" OD Drill Pipes

API specification	:	API Spec 5D & 7
API steel grade	:	G105
Total Length	m	3000
Length of each (range)	:	III
Nominal Weight	lb/ft	19.5
Internal Plastic Coating	type	N
Connection between pipe & tool joint	type	Friction welded
Tool joint Outside diameter	in	6.5/8
Tool Joint Inside diameter	in	3.3/4
Outside taper of Box connection	deg	18°
Tool Joint hardfacing	type	None
Tool Joint API connections	type	NC50
Actual API NDE classification		new

3.1/2" OD Drill Pipes

API specification	:	API Spec 5D & 7
API steel grade	type	G-105
Total Length	m	3000
Length of each (range)	no	III
Nominal Weight	lb/ft	15.5
Internal Plastic Coating	type	N
Connection between pipe & tool joint	type	Friction welded
Tool joint Outside diameter	in	4.3/4
Tool Joint Inside diameter	in	2.11/16"
Outside taper of Box connection	deg	18°
Tool Joint hardfacing	type	NONE
Tool Joint API connections	type	NC38
Actual API NDE classification	type	NEW

5" OD Drill Pipes Pup Joints

Quantity	no	2	2	2
API steel grade	type	E	E	E
Length	m	2	3	5
Nominal Weight	lb/ft	19.5	19.5	19.5

3.1/2" OD Drill Pipes Pup Joints

Quantity	no	2	2	2
API steel grade	type	G105	G105	G105
Length	m	2	3	5
Nominal Weight	lb/ft	15.5	15.5	15.5

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TUBULAR

Heavy Wall Drill Pipes

Nominal O.D.	in	5
API steel grade	type	(+)
Quantity of Joints	no	15
Length of each	m	9.15
Nominal Weight	lb/ft	50
Internal Plastic Coating	type	YES
Tool joint Outside diameter	in	6"1/2
Outside taper of Box connection	deg.	18°
Tool Joint API connections	type	NC50
Actual API N.D.E. classification	type	NEW

Short Drill Collars

quantity	no	2	2	2
Outside Diameter	in		6.1/2"	4.3/4"
Inside Diameter	in	2.13/16	2.13/16	2.1/4"
Length of each joint	m	2	2	2
Outside body	type	Spiral	Spiral	Spiral
Elevator recess	Yes/N	No	No	No
Slip recess	Yes/N	SI	SI	SI
API connection	type	6.5/8"Reg	NC46	NC38



Drill Collars

quantity	no	15	15	12
Outside Diameter	in	8"	6.1/2"	4.3/4"
Inside Diameter	in	2.13/16	2.13/16	2.1/4"
Length of each joint	m	9	9	9
Outside body	type	Spiral	Spiral	Spiral
Elevator recess	Yes/N	NO	=NO	=NO
Slip recess	Yes/N	YES=	=YES	=YES
API connection	type	6.5/8"R	NC46	NC38
"Bore-back" on box	Yes/N	SI	SI	SI
Stress Relief Groove on pin	Yes/N	SI	SI	SI
Actual API N.D.E. classification	type	New	New	New

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CSG MAKE UP

Casing Make Up Device

The device is located underneath top drive double hook with gripping patented tool, hydraulically operated from main control panel, which allows the casing rotation with adjustable torque, according to API specification. This device is specially designed to allow fluid circulation during casing running in order to avoid block and tackle with drilled hole wall. Suitable to operate casing 13.5/8", 9.5/8", 7" (other size available on request). It works with a set of link elevators 2.1/4" x 96" with load capacity of 250 tons.



Tubing spiders

Quantity no 1

Make and -type : Dencon

For O.D. tubing in 2.7/8" - 2.3/8"

Rated load Capacity mton 100

Tubing Elevators

Quantity no 1

Make and -type : Dencon

For O.D. tubing in 2.7/8 - 2.3/8 EU

Rated load Capacity m/ton 150

Manual tubing tongs

Quantity no 2

Make and -type : K-30

For O.D. tubing in 2.7/8 - 2.3/8

Powered tubing tong

Quantity no 1

Make and -type : =Eckel 5-1/2

For O.D. tubing in 2.3/8 2.7/8 3.1/2

Additional tubing equipment available on request



HH-200MM

INSTRUMENTATION

AUTOMATIC DRILLER / WOB CONTROLLER.

Drilling condition can change foot by foot, so it will be necessary to reach the best balance between max drilling speed and min wear on bits and tools. The hydraulic hoisting system solves this problem with a pressure balanced feeding device with "automatic driller / WOB controller", that "senses" the down-feed speed at any depth and, depending on the formation characteristic, adjust the feed automatically and instantly. The "automatic driller / WOB controller" function allows keeping constant the determined weight on bit while drilling. During workover operations it is frequently necessary to power the lifting line in order to "float" the weight. The "automatic driller / WOB controller" solves this problem acting as described for the drilling operations with a pressure balanced feed system that "senses" the weight at any depth and adjust feed automatically.



HH-200MM

INSTRUMENTATION

Weight Indicator

make : Drillmec + WAGNER
type : HH-200
Weight Indicator sensor type : Pressure reducer

Stand pipe Pressure Gauges

Quantity : 1
make : WAGNER
type : Analogic
pressure range indicator : 0 - 350

Stand pipe Pressure Transducers

Quantity : 1
make : WAGNER
type : Electronic
pressure range indicator : 0 - 350

Torque indicator

make : : DRILLMEC
type : : Analog
Range : ft.lbs 0 - 26,000
Torque Indicator sensor analog or digital : : Analog

Tongs pull indicator

make : : Drillmec
type : : Pressure Transducer
Pull indicator sensor : type See a.m.
Max. rated load : Kg 55,000 ft.lb

Speed indicator

make : : OMRON
type : : Digital
Range : RPM 0 - 250
Speed Indicator sensor analog or digital : : Digital

For Top Drive





INSTRUMENTATION INSIDE DRILLER'S DOG HOUSE

Drilling Parameter recorder Wagner

- Pens quantity 7
- Pneumatic
- Suitable for hazardous area
- Parameter Recorded :
 - ROP
 - Weight on hook
 - Speed
 - Top drive torque
 - SPM Pump 1
 - SPM Pump 2

Mud Pump Stroke Counter Indicator & totalizer

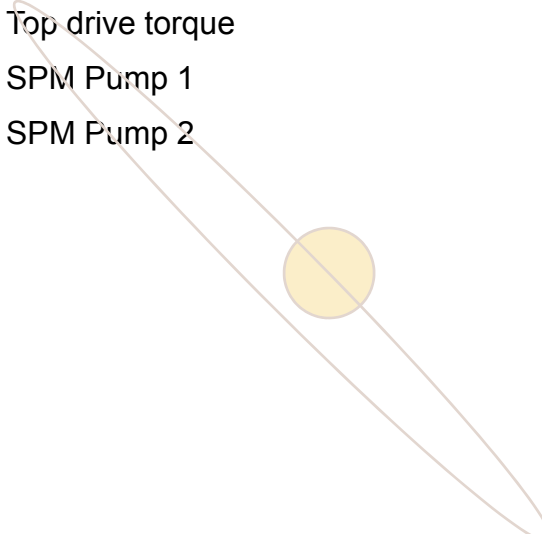
Quantity	2
make	Wagner
type	SPM
SPM Indicator sensor analog or digital	Digital

Mud Pits Volume Totalizer

make	E&H or equivalent
type	
Monitoring any single mud tank	
Pit level sensors type	
Pit level sensors installed in tanks	all active tanks
Pit Volume Gain/loss alarm	Visual + audible

Trip tank level indicator

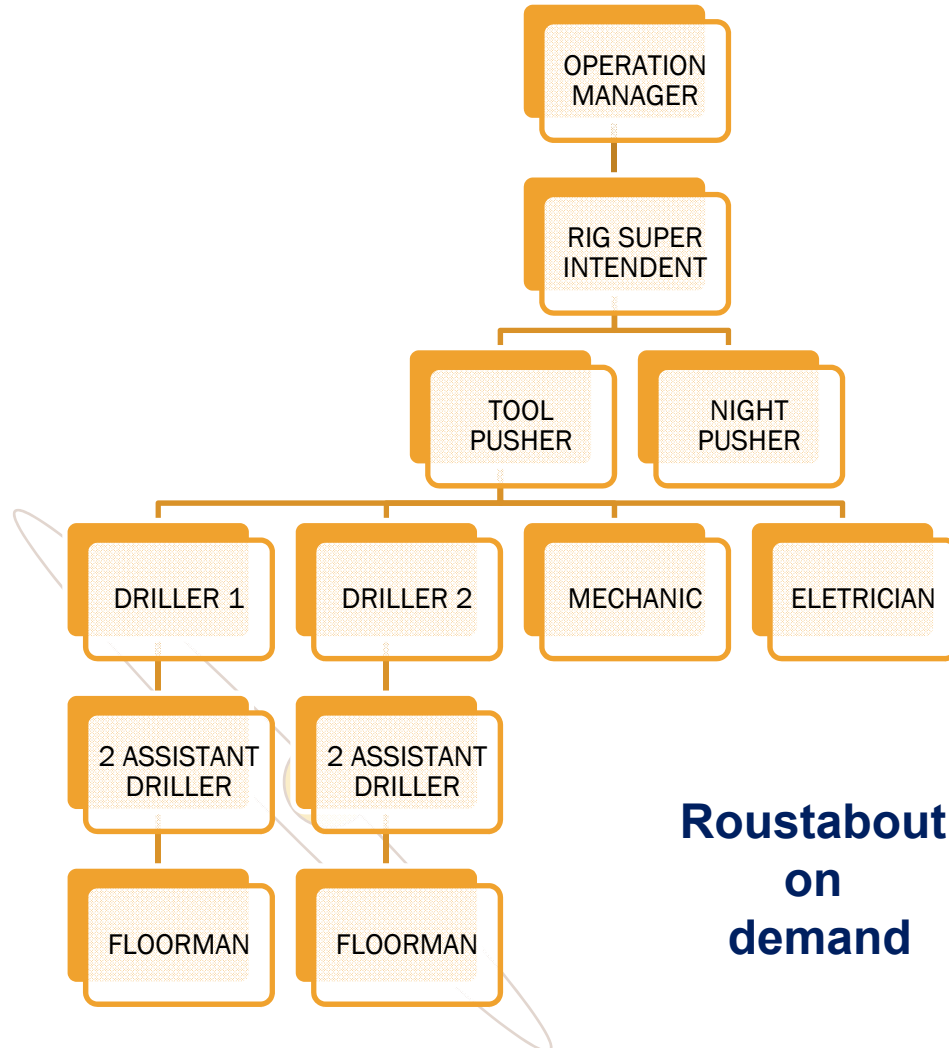
make	E&H or equivalent
type	Electronic
Pit Volume Gain/loss alarm	
Recorder	Visual + audible





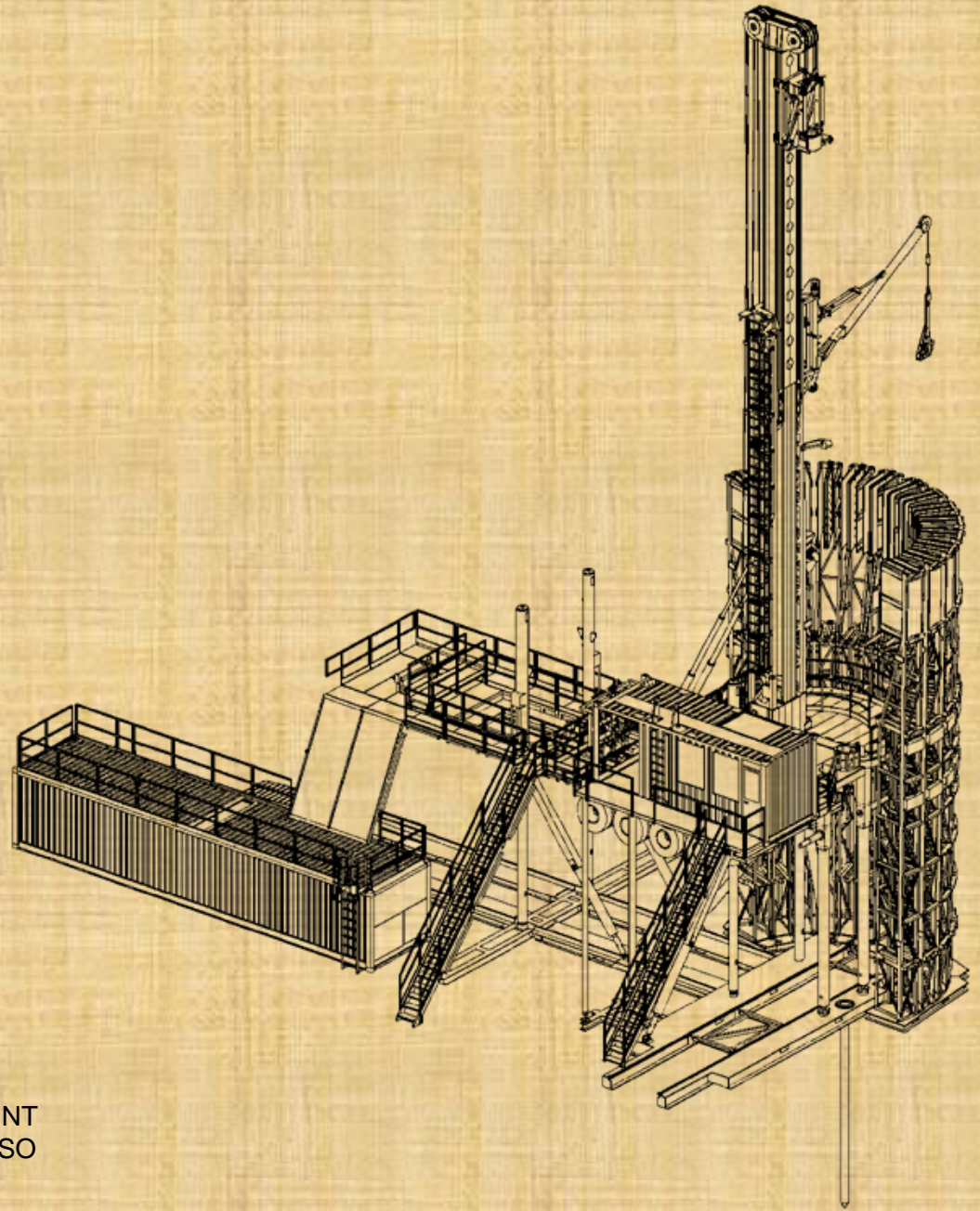
Training Courses :

IWCF
H₂S
Fire fighting
First aid

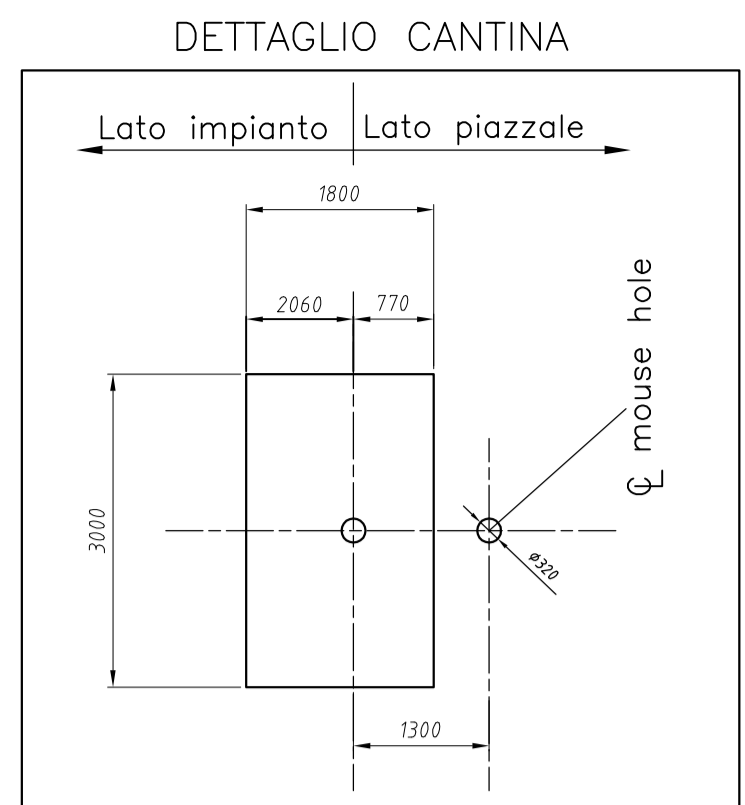
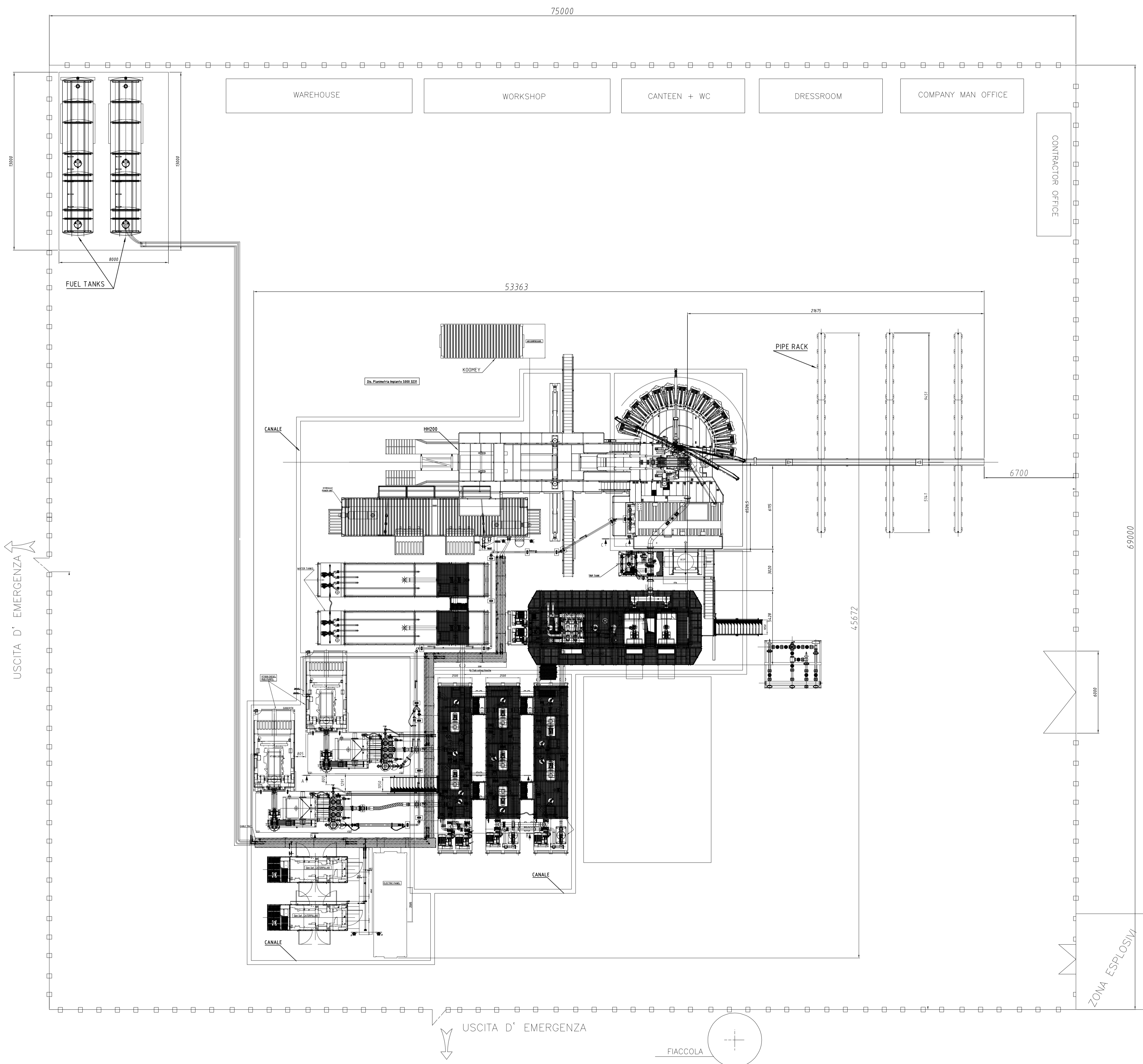


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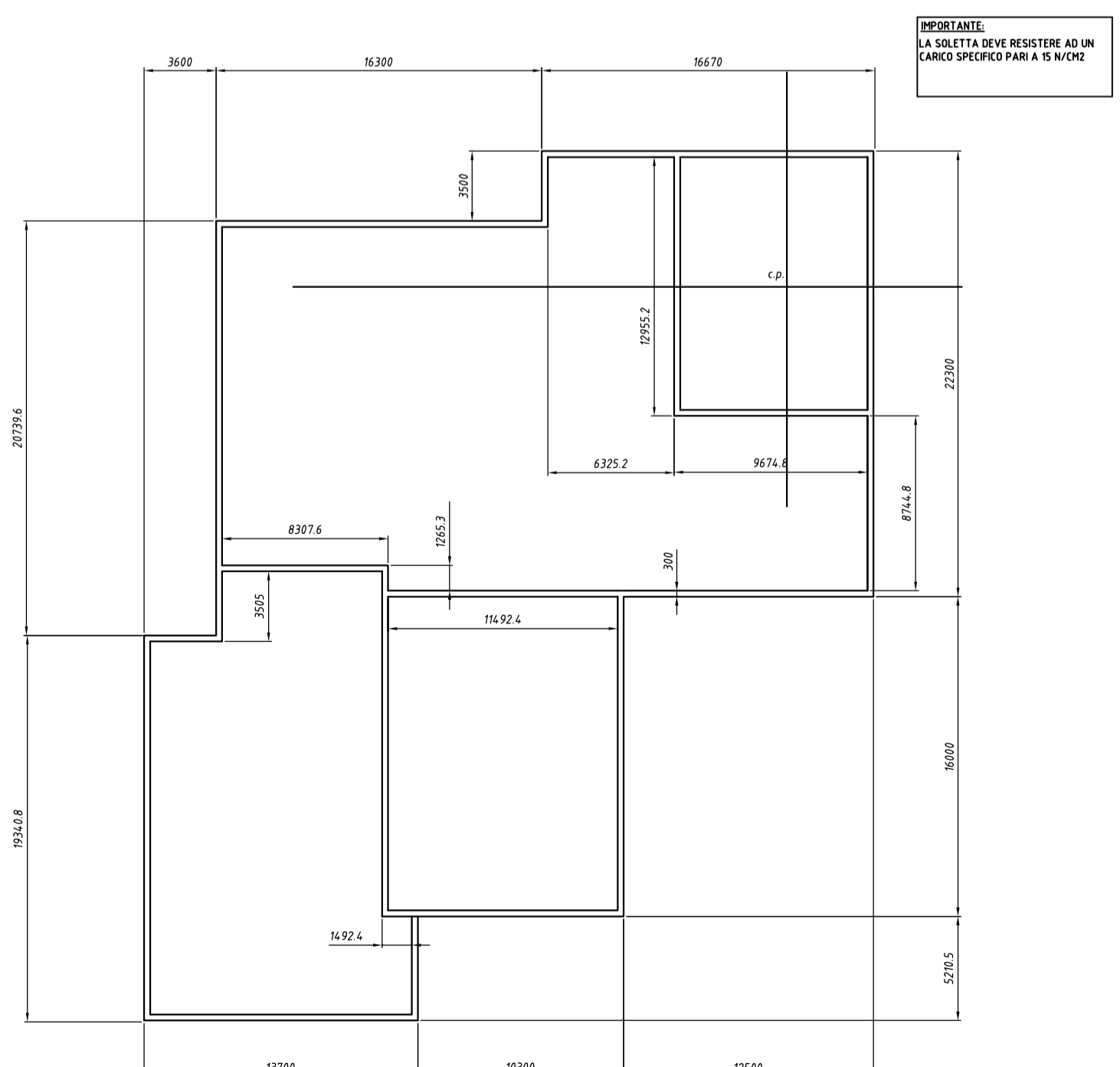
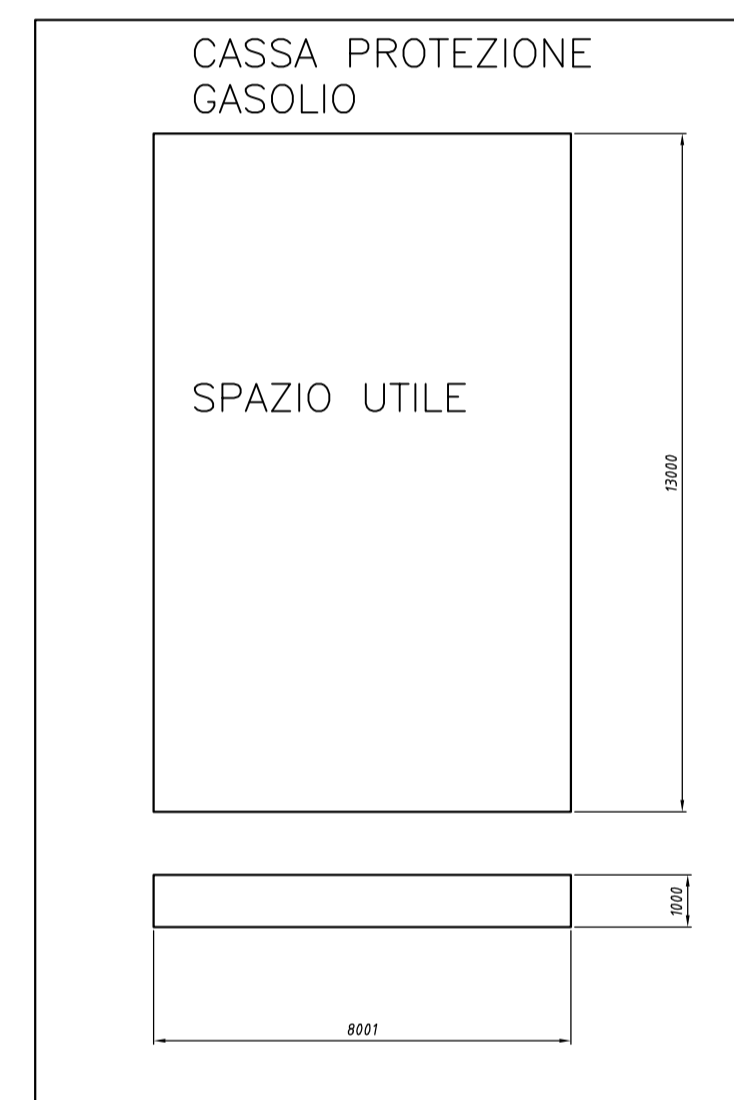
DRAWINGS



QUALITY AND ENVIRONMENTAL MANAGEMENT
SYSTEM CERTIFIED IN COMPLIANCE WITH ISO
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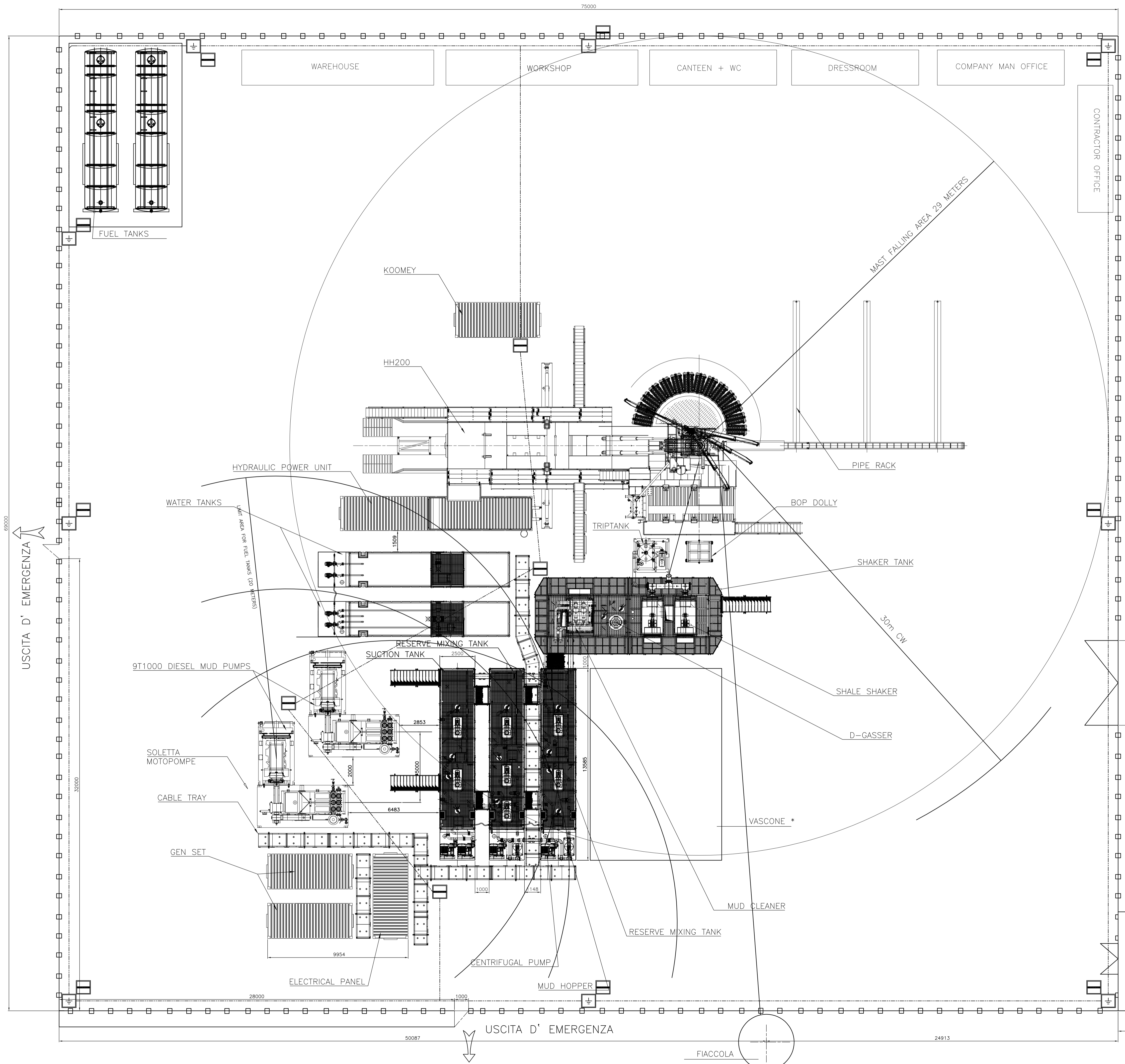
* DETTAGLIO VASCONE
 LUNGHEZZA 15000mm
 LARGHEZZA 9500mm
 PROFONDITA' 2000mm



IMPORTANTE:
 LA SOLETTA DEVE RESISTERE AD UN CARICO SPECIFICO PARI A 15 KG/CM²

Date	Drawn	Check	Approved	Note	Scale
07-04-08	07-04-08	07-04-08	07-04-08		1:100
Name	Approval	Check	Approval		Page
PERAZZOLI DRILLING S.R.L. Via Sava D'Acquato nr. 5 Cornigliano (GE) - 16016 Italy Tel. +39-052380227 Fax +39-052325447				Designation HH-200 FOOTPRINT HH-200MM-09	Sheet number 1 of 1

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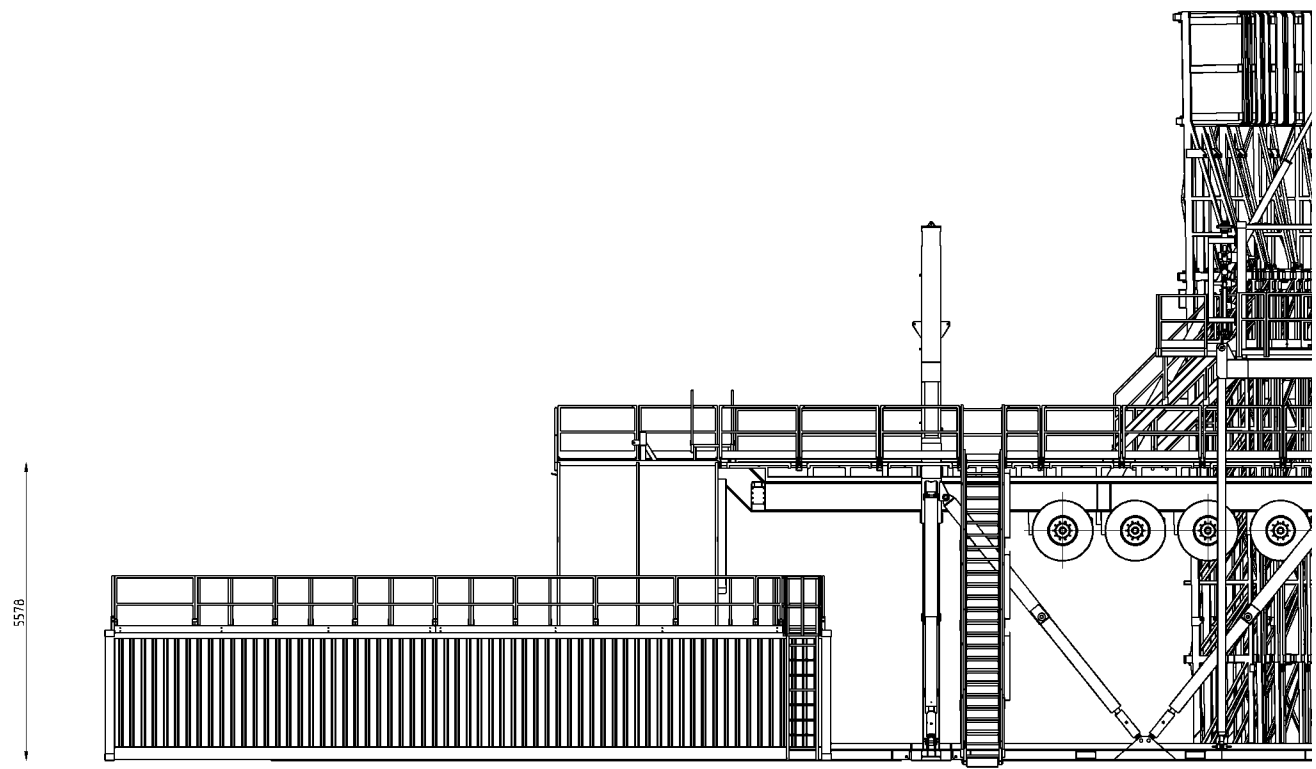
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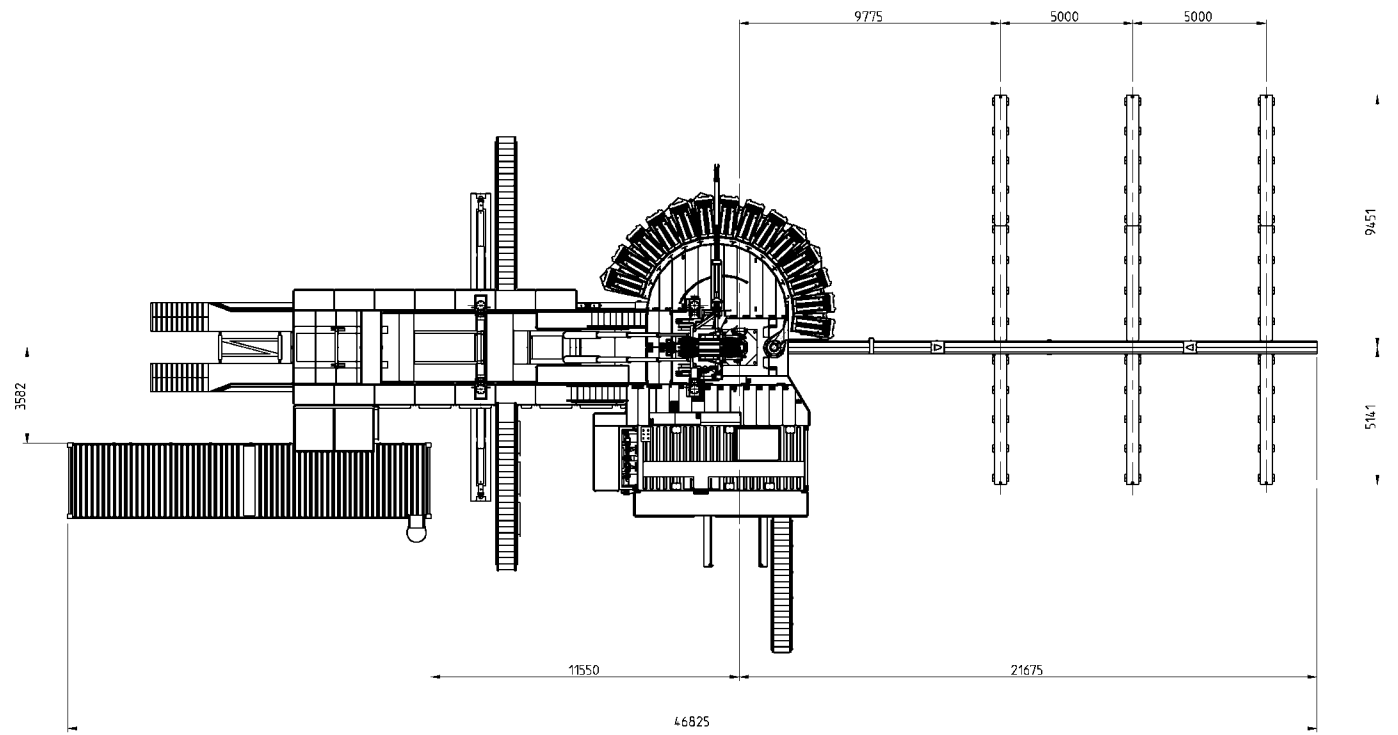
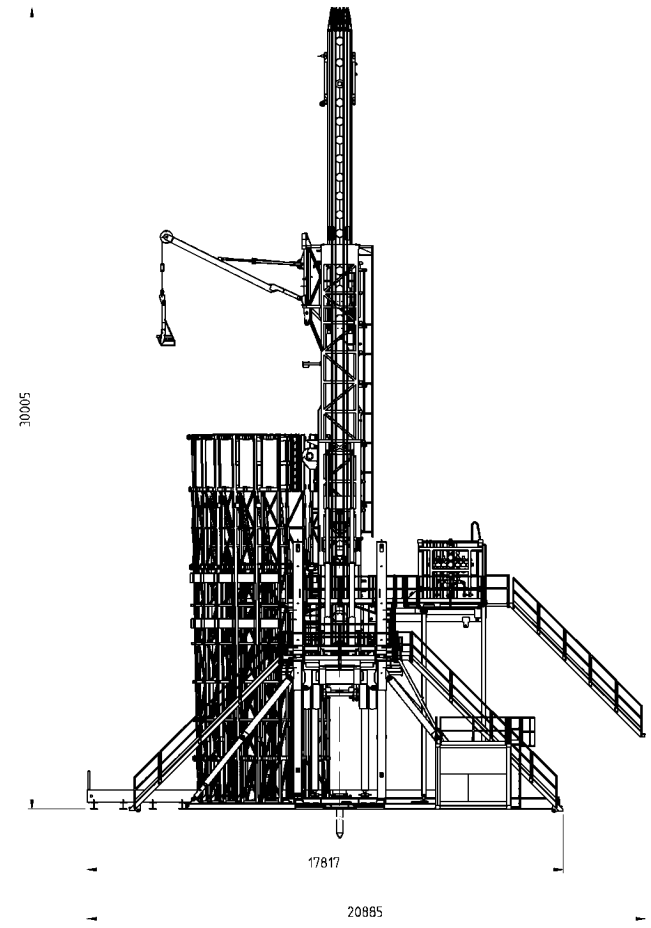
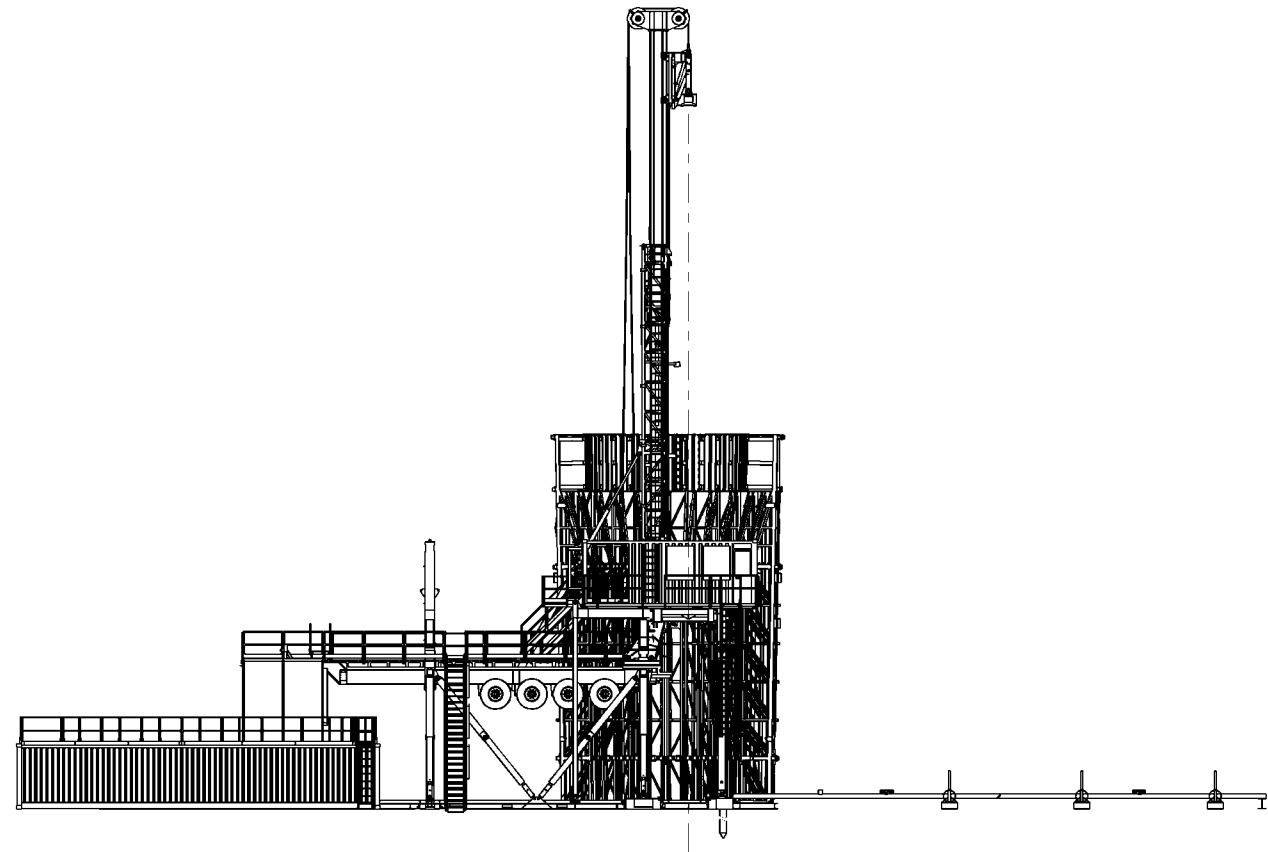
- TRECCIA IN RAME - SEZ. = 50 mmq (anello esterno)
- - - TRECCIA IN RAME INGUAINATA - SEZ. = 50 mmq
- ⊕ POZZETTO CON PUNTAZZA LUNGH. = 1,5 mt - DIAM. = 19 mm
- PIASTRA DI DERIVAZIONE

USCITA D' EMERGENZA

ZONA ESPLOSIVI

Drawn	Check	Approved	Note	Scale	1:100
Date	19.02.2008	19.02.2008	19.02.2008		
Name	Arcelloni	Bosile	Bosile	Page	1 of 1
PERAZZOLI DRILLING S.R.L. Via Sileo D'Acquillo nr. 5 Cortemaggiore (PC) - 29016, Italy Tel. +39-0523835027 Fax. +39-0523255427			Designation HH-200MM MESSA A TERRA Draw nr. HH-200MM-07	Modify number	1 2 3 4 5
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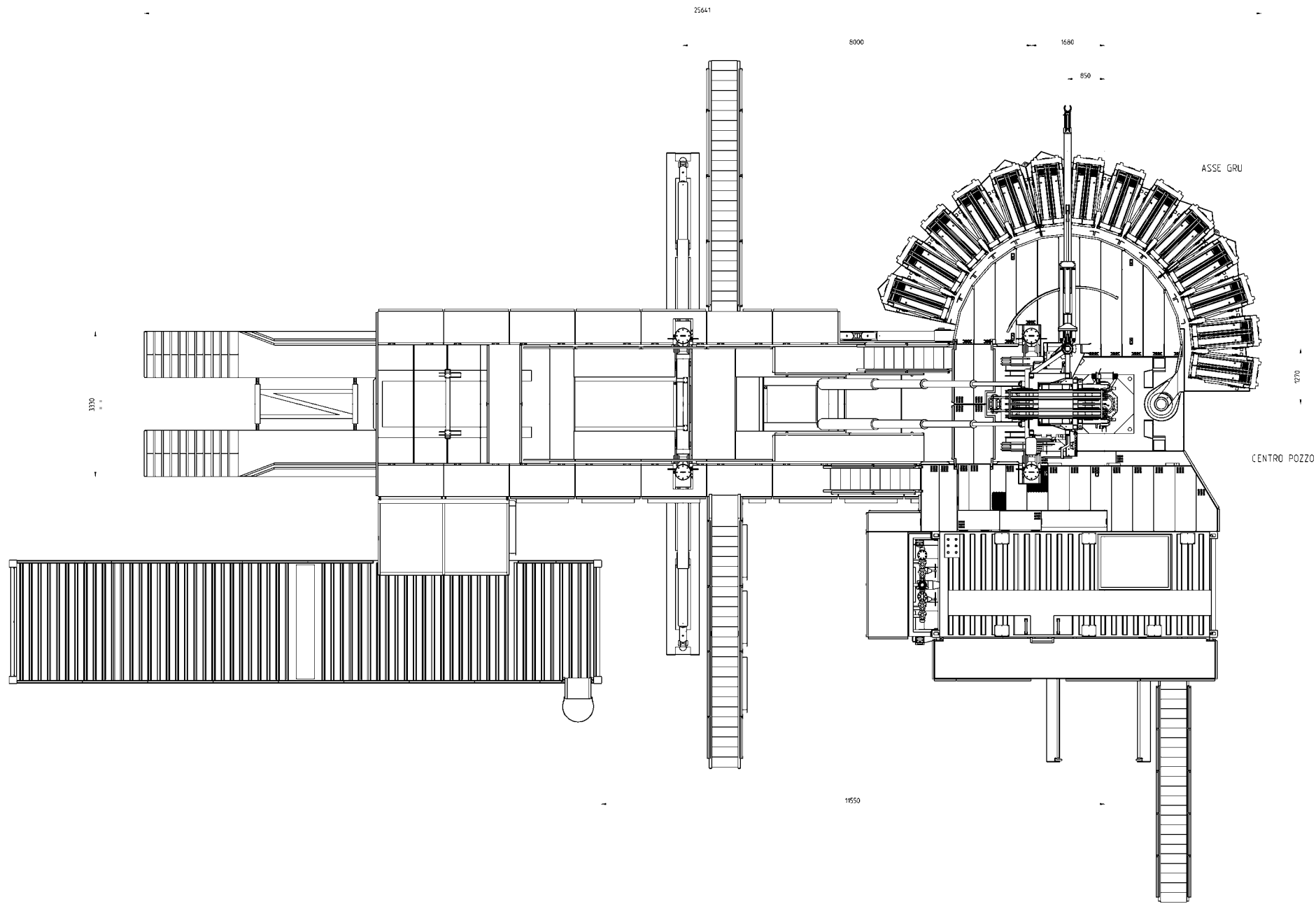




POS.	DESCRIZIONE	CIC. EE	REVISIONI	REVISIONI
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