

ALLEGATO 12

CARATTERISTICHE IMPIANTO DI PERFORAZIONE
HH 220 FA

VALUTAZIONE IMPATTO RUMORE / EMISSIONI INQUINANTI



HYDRO DRILLING S.r.l.

EXHIBIT B LAND DRILLING RIG HH220 FA

DISTRIBUTION LIST

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SUMMARY OF THE HOISTING EQUIPMENT RATINGS

MAX. RATED LOAD CAPACITIES CONSIDERING MAX. number of LINES INSTALLED				
ITEM	DESCRIPTION			Remarks
1	MAST	Static Hook load capacity With max. Number of lines	t No	200 Not Conventional rig (4 lines)
2	CROWN BLOCK	Rated load capacity	t	400
3	TRAVELLING BLOCK	Rated load capacity	t	Not Conventional rig
4	HOOK BLOCK	Rated load capacity	t	Not Conventional rig
5	SWIVEL HEAD	Rated load capacity	t	Not Conventional rig
6	TOP DRIVE	Rated load capacity	t	200
7	RAKING PLATFORM	DP Stands capacity DC Stands capacity	No No	Q.ty 12 racking bins and fingers to vertically rack the following quantities 2500m of 5" DP Q.ty 12 racking bins and fingers to vertically rack the following quantities 2500m of 3 1/2" DP
8	RIG FLOOR SET BACK	Rated load capacity	t	Not Conventional rig
9	ROTARY CAPACITY	Rated load capacity	t	200
10	DRAWWORKS: main drum line	Single Rated load capacity	t	Not Conventional rig
11	DRILLING LINE	Breaking strength Nominal diameter type	t in :	112 Ton each lines 34 mm each SO 10425 (API 9A) Q.ty 4 x 34 mm with 28 m lenght
12	DEAD LINE ANCHOR	Rated load capacity	t	Not Conventional rig
13	Max. load that Rig can handle: In drilling mode (Drilling line with safety factor >3)		t	150 Incluso il peso del Top Drive
14	Max. load that Rig can handle: In running casing mode (Drilling line with safety factor > 2)		t	200 Incluso il peso del Top Drive

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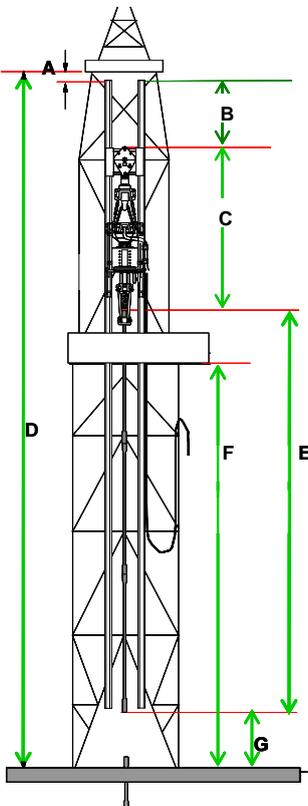
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1.1 SYMBOLS OF UNITS USED IN THIS SPECIFICATION

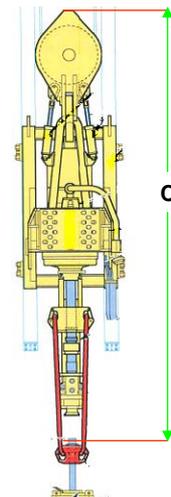
Symbol	Name
in	Inch
ft	Foot
lb/ft	Pound Per Foot
lb	Pound
bbbl	Barrel
gal	Gallon
psi	Pound Square Inch
HP	Horse Power
ppm	Part Per Million
m	Meter
cm	Centimetre
mm	Millimeter
l	Liter
m ³	Cubic Meter
S m ³	Standard Cubic Meter
m ³ / d	Cubic Meter Per Day

Symbol	Name
bar	Bar
kW	Kilowatt
kg/m	Kilogramme Per Meter
V	Volt
A	Ampere
Hz	Hertz
kVA	Kilo-Volt-Ampere
min	Minute
dbA	Decibel
deg	Degree
knots	Miles Per Hour
No	Number
RPM	Revolutions Per Minute
t	Metric Ton
d	Day

1.2 MAIN DIMENSIONS OF THE MAST

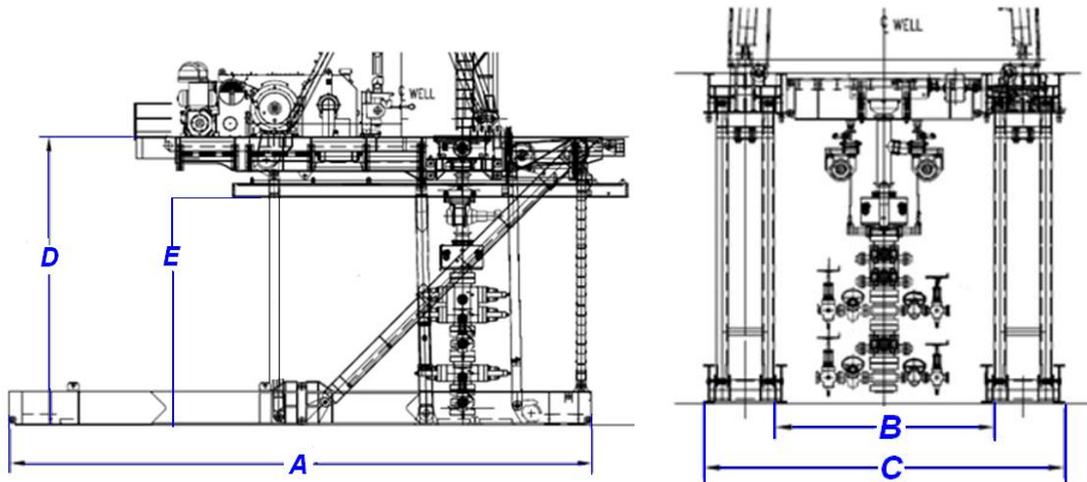


DIMENSIONS	
A	
B	
C	
D	21.30
E+G	16
F	
G	1.5



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1.3 MAIN DIMENSIONS OF SUBSTRUCTURE



A	Unconventional rig /see Drw Drilmec S0003030
B	Unconventional rig /see Drw Drilmec S0003030
C	Unconventional rig /see Drw Drilmec S0003030
D	Unconventional rig /see Drw Drilmec S0003030
E	Unconventional rig /see Drw Drilmec S0003030

1.4 DRAWINGS

.1 RIG GENERAL LAY- OUT

1	Rig General Lay-Out	:	TEC-DT-HH220 AR-001A
2	Rig General Lay-Out on Cluster	:	
3	Rig Civil Engineer Lay-Out	:	TEC-DT-HH220 AR-003A
4	Rig Skidding System Lay-Out	:	Skidding system not required
5	Rig General Lay-Out Drawing showing the hazardous areas as per applicable Rules.	:	TEC-DT-HH220 AR-027A TEC-DT-HH220 AR-028 TEC-DT-HH220 AR-029

.2 POWER PLANT & ELECTRIC SYSTEM

1	Power Plant Block Diagram	:	TEC-DT-HH220 AR-034
2	Electrical Transformer(SCR or VFD) and Drilling Motors Block Diagram	:	TEC-DT-HH220 AR-033A
3	A.C. Electrical Users Flow Diagram	:	TEC-DT-HH220 AR-033B
4	Emergency Generator Users Flow Diagram.	:	TEC-DT-HH220 AR-035

.3 MUD, WATER, CIRCULATING SYSTEM

1	Schematic Drawing of Low Pressure Mud Circulating System	:	TEC-DT-HH220 AR-016
2	Schematic Drawing of Drill Water Circulating lines	:	TEC-DT-HH220 AR-016
3	Schematic Drawing of Cleaned and Reusable Water lines	:	TEC-DT-HH220 AR-016
4	Schematic Drawing of Drilling Solids Removal System	:	TEC-DT-HH220 AR-016

.4 WELL CONTROL EQUIPMENT

	Schematic drawing of the Well Control and High Pressure Mud Circulating system showing:		
1	All the connecting lines between BOP stack, Rig Floor mud manifold, choke manifold, cementing unit, mud gas separator, flare lines.	:	TEC-DT-HH220 AR-015
2	BOP Stacks Configurations, showing the over all dimensions	:	TEC-DT-HH220 AR-011A
3	Choke Manifold Lay-Out Drawing	:	TEC-DT-HH220 AR-008A
4	Schematic Drawing of BOP Control System including Accumulator Unit, Remote Control Panels, Alarms And Emergency Back Up System	:	TEC-DT-HH220 AR-009
5	Schematic Drawing of Diverter System	:	TEC-DT-HH220 AR-010A

.5 INSTRUMENTATION

1	Schematic Drawing of Rig lay-out showing all indicator and recording instruments	:	TEC-DT-HH220 AR-004
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.6 SAFETY SYSTEMS

1	Electrical earthing schematic	:	TEC-DT-HH220 AR-005
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drawing		
2 Fire fighting equipment lay-out drawing	:	TEC-DT-HH220 AR-006
3 Safety equipment lay-out drawing	:	TEC-DT-HH220 AR-007
7 ACCOMMODATION CAMP		
1 Camp lay-out Drawing	:	
2 Camp Civil Engineer Requirements	:	

1.5 RIG GENERAL DATA

1 Rig Owner		Hydro Drilling Srl Piazza Garibaldi 31 Alessandria
2 Rig Operation Management	:	Hydro Drilling Srl Ravenna Via Buoizzi 56
3 Rig Name		Drillmec HH220FA
4 Rig Year of Construction or Assembly	:	2007
5 Actual Rig Status (Drilling-Idle-etc)	:	Idle
6 Actual Rig Location.	:	Alessandria
7 Average Fuel daily Consumption in Normal Drilling Operation	m ³ /d	4,070 in Drilling, 2,230 in WO/Well abandon
8 Total Truck Trips Required to move the Rig Between Locations	No	60
8.1 Standard Truck Trips Required to Move the Rig Between Locations	No	39
8.2 Out of Standard Truck Trips Required to Move the Rig Between Locations	No	21
9 Estimated Rig Up Time (Days)	No	12 (average)
10 Rated Hoisting Capacity of Crane Requested To handle The Heaviest Load during the Rig UP/Down	t	100

1.5.1 RIG TYPE

1 Rig Nominal Drilling Capability with 5 in OD Drill Pipes	m	3730
2 Electrical Power Generation AC-AC or AC-DC	type:	AC/DC
3 Electro/meccanic or Elecro/hydraulic	type:	Elecro/hydraulic
4 Mast suitable for single, dual or triple stand	:	1 single R3

1.6 RIG STORAGE CAPACITIES

.1 DIESEL FUEL		
1 Diesel Fuel total storage tank capacity	m ³	23
2 Diesel Fuel storage tanks quantity	No.	1
3 Diesel Fuel tank capacity of each	m ³	23
4 Diesel Fuel day-tank capacity	m ³	N/A
.2 POTABLE WATER AT RIG SITE		
1 Potable Water total capacity	m ³	5
.3 DRILL WATER		
1 Drilling Water total capacity	m ³	58
2 Drill Water tanks quantity	No.	1

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3	Drill Water tank capacity of each	m ³	58
4	Dedicated Use of each tank	:	Water
.4 LIQUID MUD			
1	Liquid Mud Tanks total capacity	m ³	300
2	Liquid Mud tank quantity	No	5
3	Liquid Mud tank capacity of each	m ³	65
.5 BULK BARITE			
1	Silos for Bulk Barite total capacity	m ³	70 on rental basis if required
2	Silos for Bulk Barite quantity	No	2
3	Silo capacity of each	m ³	35
.6 PIPE RACK			
1	Pipe Rack capacity	t	300
2	Dimensions	:	Drillmec type

1.7 RIG POWER PLANT

1.7.1 ELECTRICAL POWER GENERATOR SYSTEM

.1 A.C. ELECTRIC GENERATOR SYSTEM			
1	Diesel Engine/Generator sets	No.	3
2	Continuous power of each set	HP	1800
3	Total continuous power	HP	5400
4	Diesel Engine/Generator sets enclosed for noise attenuation	yes/no	Yes
.2 DIESEL ENGINE			
1	Diesel Engine quantity	No.	3
2	make type	:	MTU-Detroit Mod. 12V4000G41
3	Diesel Engine low emission type	yes/no	Yes
4	Diesel Engine low fuel consumption type	yes/no	Yes
5	Diesel Engine mufflers with spark arrestors	yes/no	Yes
6	Mufflers	type	Silenced w/t spark arrestor
.3 A.C. ELECTRIC GENERATORS			
1	A.C. electric generator quantity	No.	3
2	make type	:	Leroy Somer LSA 51.2 M60/4p
3	A.C. Generator Rated Power	kVA	1750
4	A.C. Generator output Voltage	V	600
5	A.C. Generator frequency	Hz	60

1.7.2 ELECTRICAL POWER TRANSFORMER SYSTEM

.1 ELECTRICAL CONVERSION SYSTEM						
1	make	:	Bentec			
2	type	type	Scr			
3	Number of generators can be connected with the conversion system	No.	4			
4	motor drivers quantity	No.	2			
5	Number of motors the conversion system can run simultaneously	No.	4			
6	Power Control Room Air conditioning system	:	Yes			
.2 ELECTRICAL TRANSFORMERS						
1	Electrical Transformers quantity	No.	1	1	1	1
2	Electric Transformers make-type	:	Bente c	Bente c	Bente c	Bente c
3	Transformer output voltage	V	600/460	600/220	480/220	480/380
4	Transformer output power	kVA	750	350	70	50
5	Transformer frequency	Hz	60	60	60	60

1.7.3 ELECTRICAL POWER FOR 3RD PARTY EQUIPMENT

.1 POWER FOR MUD LOGGING UNIT						
1	Power available	kVA	50			
2	Output Voltage	V	380, 3F +N			
3	Output Ampere	A	75			
.2 POWER FOR MUD ENGINEER CABIN						
1	Power available	kVA	5			
2	Output Voltage	V	380, 3F +N			
3	Output Ampere	A	7.3			
.3 POWER FOR DECANTING CENTRIFUGES						
1	Power available	kVA	220			
2	Output Voltage	V	440			
3	Output Ampere	A	Note: any centrifuge used by operator must be equipped with soft start to reduce the absorption at start			
.4 POWER FOR OTHER THIRD PARTY ELECTRICAL USERS						
1	Power available	kVA	50			
2	Output Voltage	V	380, 3F +N			
3	Output Ampere	A	75			

1.7.4 ELECTRICAL LIGHTING SYSTEM

.1 FIXED LIGHTING SYSTEM						
1	Lighting system complies with some rules	:	UNI 10380 - ISO 8995 - ATEX 95 (94/9/CE)			
2	Lighting around well location	No.	2			
3	Lighting around well location	type	400W Metal Iodure			

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4	Lighting around shale shaker area	No.	2
5	Lighting around shale shaker area	type	Lampade EEX-D 160 W
6	Lighting on mud tanks	No.	4+4
7	Lighting on mud tanks	type	400W Metal Iodure
8	Lighting around mud pumps	No.	1
9	Lighting around mud pumps	type	400W Metal Iodure
10	Lighting around pipe rack area	No.	2
11	Lighting around pipe rack area	type	400W Metal Iodure
12	Lighting on rig floor	No.	5
13	Lighting on rig floor	type	400W Metal Iodure
14	Lighting along the mast	No.	6
15	Lighting along the mast	type	130 W
16	Lighting on derrickman platform	No.	1
	Lighting on derrickman platform	type	400W Metal Iodure
.2 PORTABLE FLOODLIGHTS			
1	Portable floodlights	No.	3
2	Portable floodlights	type	
3	Portable floodlights power	W	400W

1.7.5 A.C. EMERGENCY POWER GENERATOR

.1 EMERGENCY DIESEL ENGINE			
1	Diesel Engine sound proof	yes/no	Yes
2	Diesel Engine make-type	:	Scania DC 12
3	Rated Power	HP	325
4	Diesel Engine Muffler with spark arrestor	yes/no	Yes
.2 EMERGENCY A.C. GENERATOR			
1	Emergency A.C. Generator make-type	:	Stamford HC44D
2	Rated Continuous Power	kVA	350
3	Output voltage	V	460
4	A.C. Generator frequency	Hz	
5	Emergency Generator automatic start in case of main circuit failure	yes/no	Yes
6	Emergency Generator with its Own Control Panel	yes/no	Yes
3 USERS FED SIMULTANEOUSLY :			
1	Emergency lighting on rig floor and along the mast	yes/no	Yes
1a	Emergency lighting on other working area	yes/no	Yes
2	Emergency lighting around diesel engine plant	yes/no	Yes
3	Emergency lighting inside PCR cabin	yes/no	Yes
4	Emergency lighting on the escape ways.	yes/no	Yes
5	Emergency lighting on safe breathing areas	yes/no	Yes
6	Emergency lighting in Mini Accommodation camp	yes/no	
7	Emergency lighting in Company office	yes/no	Yes
	Emergency lighting in Tool Pusher office	yes/no	Yes
8	Radio Communication system in Company Office	yes/no	Yes

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9	Emerg.lighting (red lights) on top of mast	yes/no	Yes
10	Electric recharging pump for BOP accumulator Unit	yes/no	Yes
11	One Electrical air compressor Unit	yes/no	Yes

1.7.6 HAZARDOUS AREAS CLASSIFICATION

.1 HAZARDOUS AREAS			
1	Which Rules the Rig follows to classify the areas	:	EN-60079 or API RP-505
2	Electric components installed in areas classified "HAZARDOUS" are certified according to Rules	:	Directive 94/9/EC (ATEX)

1.7.7 EMERGENCY ELECTRICAL SHUT DOWN DEVICE

.1 EMERGENCY SHUT DOWN STATIONS			
1	Emergency shut down Stations (ESD)	No	1 in Driller consolle, n.2 in the PCR cabin, n. 1 out of the PCR cabin
2	Number of Partial ESD stations	No	
3	Partial ESD station Location	:	
4	Number of Total ESD stations	No	
5	Total ESD station Location	:	

1.8 RIG AIR SERVICE

.1 ELECTRICAL AIR COMPRESSOR			
1	Quantity	No	2
2	Sound proofed	yes/no	GA-30
3	Make-type	:	40
4	Motor power	HP	4.2 each
5	Max. service pressure	bar	10
.2 DIESEL DRIVEN AIR COMPRESSOR			
2	Quantity	No	1 silenced
3	Make-type	:	Kaeser M80
4	Motor power	HP	80
5	Max. service pressure	bar	7
.3 AIR VESSEL			
1	Quantity	No	2
2	Air vessel capacity of each	m ³	500
3	Air vessel location	:	Near air compressor
4	Air vessel in compliance with any rules	:	PED
.4 Air Dryers			
1	Make-type	:	1 Hitema
2	Air Driers Flow Rate Capacity	m ³ /min	6200 lt/min
3	Max. service pressure.	bar	10

1.9 HOISTING EQUIPMENT SYSTEM

1.9.1 MAST & ACCESSORIES

.1 MAST			
1 Mast make	:		Drillmec HH 220 Mast
2 Mast type	:		Self erecting Hydraulic
3 Built as per ISO-API standard	No.		API 4F
4 Clear height of Mast	m		22 (from rig floor to top of mast)
4.1 Suitable for: single, double, triple stands.	:		Single R3
5 Maximum rated static hook load with guy lines, if applicable, for stated number of lines to travelling block	t		200 Ton included Top Drive weight
5.1 Max. lines strung on travelling block	No.		4 x 34 mm
6 Maximum rated wind velocity with rated capacity of pipe racked	m/s		
6.1 Maximum rated wind velocity without pipe setback	m/s		<u>Maximum wind for mast:</u> 56m/sec <u>Maximum wind for vertical pipe rack:</u> 31m/sec
7 RACKING PLATFORM			
7.1 5" Drill Pipe Stands Capacity	m		Not conventional rig. Capacity n. 272 DP 5" R3 for a total of about 3700 meters
7.2 6.3/4" Drill Collars Stands Capacity	m		- 18 Joints of 6 1/2" DC - 03 Joints of 8" DC
7.3 Fingers Suitable to Rack the following Tubular Size			
a Drill Pipes OD Body	in		5-in, 3.1/2-in
b Drill Collars OD Body	in-in		8, 6.1/2,- 4.3/4
8 Racking Platform Wind Break	yes/no		Not Conventional rig
8.1 Wind Break height	m		
8.2 Wind Break type	:		
.2. MAST ACCESSORIES			
1 Stairs going to the racking platform and to crown block complete with safety cage	yes/no		Not conventional rig
2 Red lights on top of Mast	yes/no		Yes
3 Upper Part of Mast painted for day signalling to Air-Navigation	yes/no		Yes
.4 CASING STABBING BOARD			
4.1 Type	:		N/A (Not Conventional rig)
4.2 Adjustable Height From To Casing Stabbing Board Safety Devices	m-m		
3			
a) Winch fail safe brake	yes/no		
b) Emergency Arrestor In Case Of Winch Cable/Brake Failure	yes/no		
c) Automatic locking when the winch control valve is in the neutral position.	yes/no		
e) Top And /Bottom Track Limit	yes/no		

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	Switches		
f)	Shock absorber at track bottom.	yes/no	
.5	ON MAST VIDEO CAMERA		N/A (Not Conventional rig)
1	Quantity	No	
2	make type	:	
3	Certified to be installed in hazardous area	yes/no	
4	Location		
5.1	Monitor	No	
1	make and type		
2	Location	:	
3	Certified to be installed in hazardous area	yes/no	
.5	TOP DRIVE GUIDANCE SYSTEM		
1	Top Drive Guidance (torque tube, rails,)	Type	Not Conventional rig (Top Drive pantographe)
2	Are also the traveling block guided with?	yes/no	

1.9.2 SUBSTRUCTURE & RIG FLOOR

.1.	SUBSTRUCTURE		
1	Substructure make-type	:	Drillmec HH 220 Hydraulic
2	Rated Rotary Load Capacity	t	200
3	Rated Pipe Setback Load Capacity	t	Not Conventional rig
4	Substructure built as per ISO-API standard	No.	API 4F
5	Clear height between Rotary Beams And Ground Level	m	7 (suff. for BOP 13 5/8" 10M)
6	Rig Floor Height From Ground Level	m	7.71
7	Free height of trasversal bracings	m	
.2.	RIG FLOOR		
1	Rig Floor over all Dimensions	m-m	6x5.8
2	Rig Floor Drains Collecting System	yes/no	Yes
2.1	Drains discharging to Rotary Table Drains Collecting System	:	Flow line/Cellar
3	Drains discharging to Rig Floor ingress-egress stairs	yes/no	
3.1	Drains discharging to Rig Floor Wind Breaks	:	
6	Rig Floor ingress-egress stairs	No.	3
7	Drains Discharging to Rig Floor Wind Breaks	:	
8	Rig Floor Wind Breaks	yes/no	Not Applicable
8.1	Wind Break height	m	
8.2	Wind Break type	:	
.3	DRILLER'S CABIN		
1	Dimensions Length, wide, height	:	7500 x 2435 x 2585 (mm)
2	Complete with	:	
3	Cabin Air conditioning system	yes/no	Yes
4	Cabin heating system	yes/no	Yes
5	Microphone to talk with the rig floor crew	yes/no	Yes

1.9.3 DRAWWORKS & ACCESSORIES

.1 DRAWWORKS			Not Applicable (not conventional rig)
1	make-type	:	Hydraulic Hoist System
2	Rated input power	HP	1224
3	Single line Drum rated pull capacity	t	n. 1 hydraulic piston 200 Ton
4	Drum grooved for OD line	in	34 mm (4 drillin lines)
.1.1 Drawworks Power			
1	Number of Electric Motors	No.	See Hydraulic hoist system
2	make	:	
3	type	:	
4	Output Power	HP	
.1.2 Drawworks Auxiliary Brake			
1	make	:	See Hydraulic hoist system
2	type	:	
3	Emergency Back-Up System	yes/no	
4	Emergency Back-Up System	type	
.2. AUTOMATIC DRILLER SYSTEM			
1	make	:	Drillmec
2	type	:	0.05 Ton WOB Accuracy
.3. HYDRAULIC CATHEAD (EZY TORQUE)			
1	Quantity	No	See Power Tong
2	make type	:	
3	Max line pull	t	
.1 CROWN BLOCK			
1	Make and type	:	Drillmec
2	Crown Block built as per ISO-API standard	No.	API 4F
3	Rated Load Capacity	t	400
4	Sheaves number and outside diameter	No-in	Q.ty 8 x 800 mm
5	Groove of Sheaves for O.D. wire line	in	34 mm (1.3")
.6 DRILLING LINE			
1	Size and length	in-	4 lines x 34 (mm) with 28 m lenght
2	Breaking strength	t	112 Ton each lines
3	Built as per ISO (API) standard	No.	ISO 10425 (API 9A)
.7. DERRICK SAFETY DEVICES			
7.1 Crown Block Safety device			
1	make	:	Hydraulic piston + electric Switch as additional crown block safety device
2	type	:	protection
7.2 Travelling Block Anti Collision Device			
			See above
1	Make	:	
2	Type	:	
3	With Upper safety arrestor	yes/no	
4	With Lower safety arrestor	yes/no	

1.10 ROTATION EQUIPMENT SYSTEM

1.10.1 TOP DRIVE ASSEMBLY

1 TOP DRIVE			
1	make-type	:	Drillmec HTD 200
2	Built as per ISO 13535 (API 8C-PLS-2)	yes/no	13535
3	Rated load capacity	t	200
4	Maximum continuous output torque	ft.lbs	26000
5	At related rotating speed	RPM	80 RPM with 100% efficiency
6	Maximum rotating speed	RPM	200
7	Rated working pressure	psi	5000
8	With retractable dolly assembly	yes/no	N/A (Top Drive pantograph)
1.1 Top Drive Swivel			
1	Integral Swivel type	yes/no	Integrated with Top Drive
2	Wash pipe Inside diameter	in	
3	Access Fitting for Wire line on Gooseneck	yes/no	
1.2 Top Drive Driving system			
1	Driving motor type (Electrical or Hydraulic)	:	Hydraulic
2	Quantity of Motors	No.	M7 Denison x 4
3	Gear box single or dual speed type	:	Dual speed
4	Motor max. continuous output power	HP	193 hp at 2000 rpm
1.3 Top Drive Motor Cooling System			
1	Air cooling type	yes/no	Yes
2	Closed loop air/water cooling system	yes/no	Air/oil cooling system
3	System certified for hazardous area	yes/no	Yes
1.4 Top Drive Pipe Handler			
1	Degrees of Head Rotating Capacity	:	Not Applicable (Top Drive pantographe)
2	Link Tilt type (Air or Hydraulic powered)	:	
3	Link tilted system capable of full access to the mouse hole	yes/no	Yes (Top Drive pantographe)
4	Max tilted angle backward from vertical	deg	Not Applicable (Top Drive pantographe)
5	Max. torque Wrench capacity	ft.lb	max.make-up torque capacity 36200 ft.lbs; max.break-out torque capacity 50600 ft.lbs
6	Jaws for O.D. range connections	in-in	
.1.5 INSIDE BOP VALVES			
A Hydraulic Operated Valve			
1	Quantity	No.	1
2	make-type	:	Kelly Valve NC 50 M&M

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3	Inside diameter and working pressure	in-psi	2 13/16" – 10k	
4	Top connection type	:	NC 50	
5	Bottom Connection type	:	NC 50	
6	Spare IBOP Valve	No.	1	
B Manual Operated Valve				
1	Quantity	No.	1	
2	make-type	:	Kelly Valve NC 50 M&M	
3	Inside diameter and working pressure	in-psi	2 13/16" – 10k	
4	Top connection type	:	NC 50	
5	Bottom Connection type	:	NC 50	
6	Spare IBOP Valve	No.	1	
.1.6 Top Drive Saver Sub				
			For 5" drill pipes	For 3.1/2 drill pipes
1	Top connection type	:	NC 50	NC 50
2	Bottom Connection type	:	NC 50	NC 38
1.7 Top Drive Link Elevators				
A for drill pipes				
1	Link Elevators make type	:	Varco	
2	size x length	in-in	1 set da 2 1/4 " x 96"	
3	rated load capacity	t	250	
4	Built as per ISO	:		
B for casing				
1	Link Elevators make type	:	Varco	
2	size x length	in-in	1 set da 2 1/4 " x 180"	
3	rated load capacity	t	250	
4	Built as per ISO	:		
1.8 Top Drive Wire Line Accessories				
1	accessories kit	yes/no	No	

1.10.2 ROTARY TABLE & ACCESSORIES

.1 ROTARY TABLE				
1	make and type	:	Drillmec R27.5	
2	API rated load capacity	t	200	
3	Maximum opening	in	27 1/2"	
4	Motor make-type	:	Dennison	
.2 MASTER BUSHING				
1	Make and type	:		
2	API Insert Bowl size	No.	1 (2 - 3 substituted by BR 200t clamp)	
.3 ROTARY TABLE ANTISLIPPING PAD				
1	make and type	:	Yes	

1.11 RIG FLOOR TOOLS

.1. MANUAL TONGS COUNTERBALANCE SYSTEM

- | | | | |
|---|-------------------|--------|----|
| 1 | Installed | | |
| 2 | Quantity | yes/no | No |
| 3 | Remote adjustable | yes/no | |

Not applicable; Available
Automatic power tong (For automatic spinning, make-up and break-out connection)

.2 OTHER RIG FLOOR EQUIPMENT

- | | | | |
|---|-------------------------------------|--------|-------------------------|
| 1 | Mouse hole size | in | 12 3/4" |
| 2 | Rat hole size | in | Not applicable |
| 3 | Mud saver bucket | yes/no | Yes |
| 4 | Mud saver bucket for OD drill pipes | in | Drill pipes 3.1/2 to 5" |

1.12 UTILITY HOIST EQUIPMENT

.1 RIG FLOOR HOIST WINCH

- | | | | |
|----|----------------------------|--------|-----------|
| 1 | Quantity | No | |
| 2 | Make | : | Drillmec |
| 3 | Type | : | Hydraulic |
| 4 | Rated capacity | t | 12 |
| 5 | Wire Diameter | mm | |
| 6 | Safety Arrestor | yes/no | Yes |
| 7 | Complete with limit switch | yes/no | Yes |
| 8 | Automatic spooling | yes/no | Yes |
| 9 | Safety guard | yes/no | Yes |
| 10 | Certified for man-riding | yes/no | No |

Unconventional rig	
1 JIB crane	1 Auxiliary JIB crane
:	Drillmec
:	Hydraulic
t	4
mm	
yes/no	Yes
yes/no	No

.2 RIG FLOOR PERSONNEL HOIST BASKET

- | | | | |
|---|-----------------------------------|--------|-----------|
| 1 | Quantity | No. | 1 |
| 2 | Make and type | : | 27 Meters |
| 3 | Hydraulic or Air Operated type | : | TBD |
| 4 | Rated Hoist Capacity | kg | 200 Kg |
| 5 | Certified as per local Regulation | yes/no | Yes |

On monthly rental basis

.3 WORKING WINCH ON DERRICKMAN PLATFORM

- | | | | |
|---|--------------------------------|-----|--|
| 1 | Quantity | No. | |
| 2 | Make and type | : | |
| 3 | Hydraulic or Air Operated type | : | |
| 4 | Rated Pull Capacity | t | |

Not Applicable
(UNCONVENTIONAL RIG)

.4. HOIST WINCH INSIDE THE SUBSTRUCTURE

- | | | | |
|---|----------------------------|--------|--|
| 1 | Quantity | No | |
| 2 | Make | : | |
| 3 | Type | : | |
| 4 | Rated capacity | t | |
| 5 | Wire Diameter | mm | |
| 6 | Safety Arrestor | yes/no | |
| 7 | Complete with limit switch | yes/no | |
| 8 | Automatic spooling | yes/no | |
| 9 | Safety guard | yes/no | |

Not Applicable

.5 BOP HANDLING SYSTEM

**CONTRACTOR'S
OFFER**

INSIDE THE SUBSTRUCTURE			
1	make and type	:	Drillmec
2	Electric or Hydraulic driven	:	Hydraulic
3	Rated Hoist Capacity	t	40 t
4	Maximum Vertical travelling stroke	m	1.2
5	Maximum Horizontal travelling stroke	m	N/A
6	Handling System certified	yes/no	Drillmec
.6. BOP SUPPORT BASE SYSTEM INSIDE THE SUBSTRUCTURE			
1	With capability to store the BOP in the substructure	yes/no	Yes
2	Complete with trolley	yes/no	Yes
3	For BOP size	:	13 5/8" 10K

1.13 MUD CIRCULATING SYSTEM

1.13.1 HIGH PRESSURE MUD PUMPS

1 MUD CIRCULATING SYSTEM			
1	All the high pressure end connections with the nominal diameter of 2-in and larger flanged or welded?	yes/no	Flanged or hub
2	Seal elements are oil base resistant	yes/no	Yes
.2 MUD PUMPS			
1	Mud pumps installed	No.	2
2	Make Type	:	Drillmec mod. 12T 1600 Triplex
3	Rated input power	HP	1300
4	Working Pressure	psi	5000
5	Pulsation Dampener: make, type	:	K20-5k
5.1	Pulsation Dampener Working Pressure	psi	5000
6	Discharge Relief Valve: make, type	:	MCM O'DRILL Type C
	Discharge Relief Valve Working Pressure	psi	1500-6200 (psi)
7	Size of liners available	in	6" - 5 1/2" - 5"
2.1 Mud Pumps Driving Motors			
1	Q.ty of motors installed	No.	2 each pump
2	make	:	GE
3	type	:	GE 752 DC Series Motors
4	Motor Output Power	HP	1000 each motor
2.2 Surcharging Pump			
1	Surcharging Pump	No	1 each pump
2	Make	:	MCM O'DRILL 5 x 6
3	Type	:	MCM O'DRILL 5 x 6
4	Impeller Diameter	in	11
5	Driving motor	HP	75
6	Driving motor speed	RPM	1750

**CONTRACTOR'S
OFFER**

2.3 Mud Pumps Control Panel

- | | | | |
|---|-----------------------------------|--------|-----|
| 1 | Remote panel on driller's Console | yes/no | Yes |
| 2 | Local panel near Mud Pumps | yes/no | Yes |

.3 MUD PUMP SUCTION LINES

- | | | | |
|---|-----------------|-----|----|
| 1 | Quantity | No. | 2 |
| 2 | Inside Diameter | in | 10 |

.3.1 Mud Pump Suction Dampeners

- | | | | |
|---|---------------|-----|----------|
| 1 | Quantity | No. | 2 |
| 2 | make and type | : | Drillmec |

.3.2 Mud Pump Suction Filters

- | | | | |
|---|---------------|-----|----------|
| 1 | Quantity | No. | 2 |
| 2 | make and type | : | Drillmec |

.3.3 Mud Pump Discharge Line Filters

- | | | | |
|---|----------|-----|-------------------|
| 1 | Quantity | No. | One each mud pump |
|---|----------|-----|-------------------|

.4. MUD PUMP DISCHARGE LINES

4.1 Mud Pump Discharge Lines: FLEXIBLE SECTION

- | | | | |
|---|--------------------------------|-----|----------------|
| 1 | Quantity | No. | 2 |
| 2 | type | : | Vibrator hoses |
| 3 | Inside Diameter | in | 3 1/2" |
| 4 | Rated working Pressure | psi | 5000 |
| 5 | Built as per API specification | No. | API 7K grade D |

4.2 Mud Pump Discharge Lines: RIGID SECTION

- | | | | |
|---|------------------------|-----|--------|
| 1 | Quantity | No. | 2 |
| 2 | Inside Diameter | in | 4" |
| 3 | Rated working Pressure | psi | 5000 |
| | | | API 5L |

.5. RIG FLOOR MUD MANIFOLD

5.1 Valves

- | | | | |
|---|---------------------|--------|-------------------------------------|
| 1 | Make- type | | 7 + 2 lo torque Demco or equivalent |
| 2 | Size | In/psi | 4.1/16" - 5000 & 2 1/16" 5000 |
| 3 | End connection type | : | welded |

5.2 Outlet Connections

- | | | | |
|----|---|--------|-----------------------------|
| 1 | For pressure Gauges | yes/no | Yes |
| 2 | For pressure transmitters | yes/no | Yes |
| 3 | For Mud Logging Sensor | yes/no | Yes |
| 4 | For MWD Sensor | yes/no | Yes |
| 5 | For Line to Kill Manifold | yes/no | Yes |
| 6 | For Line to fill-up the Well | yes/no | Yes |
| 7 | For Line to fill-up the Casing | yes/no | Yes (casing make up device) |
| 8 | For Line to bleed off the pressure | yes/no | Yes |
| 9 | For reverse circulation Line | yes/no | Yes |
| 10 | All outlets complete with isolation Valve | yes/no | Yes |

**CONTRACTOR'S
OFFER**

.5.3 Stand-Pipes

- 1 Stand-Pipes
- 2 Inside Diameter / working pressure

No. 1
In/psi 4" 5000

5.4 Rotary Hoses

- 1 Rotary Hoses
- 2 Inside Diameter / working pressure
- 3 API specification
- 4 Spare rotary hose

No. 1
In/psi 3 1/2" x 43 ftx 5000
: API 7K grade D
yes/no 1

1.13.2 LOW PRESSURE MUD SYSTEM

.1. MUD TANKS

- 1 Total number of mud tanks installed
- 2 Mud tanks total capacity

No. 5
m³ 300

1.1 Mud Tank No.1

- 1 Capacity
- 2 Tank dimensions (H-W-L)
- 3 Electric agitator
- 4 Divided in compartments
- 5 Electric agitator
- 6 Electric agitator
- 7 Driven by motor
- 8 Bottom guns

m³ 50 (treatment)
m-m-m 11 x 2.45 x 2.50
No. No
4: 10 (sand trap) - 10 - 13
No. - 17
make
type
HP
type

1.2 Mud Tank No.2

- 1 Capacity
- 2 Tank dimensions (H-W-L)
- 3 Electric agitator
- 4 Divided in compartments
- 5 Electric agitator
- 6 Electric agitator
- 7 Driven by motor
- 8 Bottom guns

m³ 65 (suction)
m-m-m 13 x 2,45 x 2,5
No.
No. 1: 65
make 3
type Samic
HP 15
type 3 (3")

1.3 Mud Tank No.3

- 1 Capacity
- 2 Tank dimensions (H-W-L)
- 3 Electric agitator
- 4 Divided in compartments
- 5 Electric agitator
- 6 Electric agitator
- 7 Driven by motor
- 8 Bottom guns

m³ 65 (mixing)
m-m-m 13 x 2,45 x 2,5
No.
No. 2: 45 - 20
make 3
type Samic
HP 15
type 3 (3")

1.4 Mud Tank No.4

- 1 Capacity
- 2 Tank dimensions (H-W-L)
- 3 Electric agitator
- 4 Divided in compartments
- 5 Electric agitator

m³ 65 (reserve)
m-m-m 13 x 2,45 x 2,5
No.
No. 2: 45 - 20
make 3

**CONTRACTOR'S
OFFER**

6	Electric agitator	type	Samic
7	Driven by motor	HP	15
8	Bottom guns	type	3 (3")
1.5 Mud Tank No.5			
1	Capacity	m ³	65 (reserve)
2	Tank dimensions (H-W-L)	m-m-m	13 x 2,45 x 2,5
3	Electric agitator	No.	
4	Divided in compartments	No.	2: 40 - 25
5	Electric agitator	make	3
6	Electric agitator	type	Samic
7	Driven by motor	HP	15
8	Bottom guns	type	3 (3")
1.6 Waste Pit No. 1			
1	Capacity	m ³	On Rental Basis 30
2	Tank dimensions (H-W-L)	m-m-m	4.15 x 2.45 x 9.5
1.6 Waste Pit No. 2			
1	Capacity	m ³	On Rental Basis 30
2	Tank dimensions (H-W-L)	m-m-m	4.15 x 2.45 x 9.5
1.6 Waste Pit No. 3			
1	Capacity	m ³	On Rental Basis 30
2	Tank dimensions (H-W-L)	m-m-m	4.15 x 2.45 x 9.5
.2. OTHER RESERVE MUD TANKS			
1	Total number	No.	
2	Capacity of each	m ³	
3	Tank shape (circular or rectangular)	:	
4	With mud agitation system	yes/no	
.3. WATER TANKS			
1	Tanks total water capacity	m ³	58
2	Total number	No.	1
3	Capacity of each	m ³	Divided in 2 compartments (29 - 29)
4	Tank dimensions (H-W-L)	m-m-m	

1.13.3 MUD MIXING SYSTEM

.1 MUD MIXING SYSTEM			
1	The system allows the simultaneously operations of:		
2	Make new mud	yes/no	Yes
3	Weighing active mud	yes/no	Yes
		:	
.2 MUD MIXING UNIT			
1	Mud Mixing Unit quantity	No.	1
2	with the capability to handle big bags	yes/no	Yes
Each Mud Mixing Unit complete with			
2.1 Mud mixing pumps			
1	Quantity	No.	2
2	Make and type	:	Mission 6 x 8
3	Impeller Diameter	in	11

CONTRACTOR'S OFFER

4	Packing Seal Type	:	Seal typer w/automatic lubricator
5	Driven by motor power	HP	100
6	Rotating speed	rpm	1750
2.2 Mud mixing Hoppers			
1	Quantity	No.	2
2	Make and type	:	Drillmec (Vortex Ventures Type)
.5. Chemical Mixing tank			
1	Capacity	m ³	1
2	Complete with electrical mixer	yes/no	Yes

1.13.4 SILOS

.1 SILOS FOR BARITE

1	Quantity	No.	2. On rental basis
2	Horizontal or vertical type	:	Vertical
3	Capacity of Each	m ³	35
4	Total capacity	m ³	70
5	Weight Indicator	yes/no	Yes
6	Type	:	electronic
7	Safety valve	yes/no	Yes
8	Certified as pressure vessel	yes/no	PED

.2 SURGE TANK FOR BARITE

1	Quantity	No.	1. On rental basis
2	Pressurized or gravity type	:	Gravity
3	Capacity of Each	m ³	2
4	Weight Indicator	yes/no	No
5	Level indicator	yes/no	No

.3 AIR COMPRESSOR UNIT

1	Make and type	:	Kaiser M80
2	Sound proofing	yes/no	Yes
3	Continuous power	hp	79
4	Capacity	m ³ /hr	8.1 (mc/min)
5	Pressure	bar	7
6	Safety valve	yes/no	Yes

.4 DUST COLLECTOR

1	Quantity	No.	1
---	----------	-----	---

1.13.5 MUD TREATMENT SYSTEM

.1 SAND TRAP TANK

1	Quantity of compartments	No.	1
2	Capacity of each	m ³	10
3	Bottom sloped	yes/no	Yes
4	Quick cuttings discharging device	yes/no	Yes

.2 DEGASSER TANK

1	Quantity of compartments	No.	1
---	--------------------------	-----	---

**CONTRACTOR'S
OFFER**

2	Capacity of each	m ³	10 (see treatment tank)
3	Bottom Shape	:	No
.3 MUD CLEANER TANK			
1	Quantity of compartments	No.	1
2	Capacity of each	m ³	13 (see treatment tank)
3	Bottom Shape	:	No
.4 EQUALIZING TANK			
1	Quantity of compartments	No.	1
2	Capacity of each	m ³	17 (see treatment tank)
3	Bottom shape	:	No
.5 HIGH EFFICIENCY SHALE SHAKER			
1	Quantity	No.	1
2	Make	:	Brandt
3	Type	:	Triple Cobra Shaker Package
4	Screen type	:	Ultra flow BHX
		mesh	(24 - 38 - 50 - 84 - 110* - 140 * - 175*)°
5	Screen available size		* larger than 100mesh, will be charged back to the Client
.6 DE SANDER UNIT			
1	Make and type	:	
2	Cones size and quantity	in-no	
3	Feed pump make-type	:	
4	Impeller Diameter	in	
5	Driven by motor power	HP	
6	Rotating speed	RPM	
.7 DE SILTER UNIT			
			Installed on one deck of the shale shakers
1	Make and type	:	Brandt SE-12
2	Cones size and quantity	in-no	4 x 12
3	Feed pump make-type	:	
4	Impeller Diameter	in	
5	Driven by motor power	HP	
6	Rotating speed	RPM	
.8 MUD CLEANER UNIT			
			See De Silter
1	Quantity	No.	
2	Make and type	:	
3	Cones size and quantity	in-no	
4	Feed pump make-type	:	
5	Impeller Diameter	in	
6	Driven by motor power	HP	
7	Rotating speed	RPM	
8	Screen available make	:	
9	Screen available type	:	
10	Screen available size	mesh	
11	Drilling cutting directly discharged to	:	
.9 DECANTING CENTRIFUGES			
1	Quantity	No.	No

**CONTRACTOR'S
OFFER**

2	Make and type	:	
3	Drilling cuttings discharging to	:	
10 DEGASSER UNIT			
1	make and type	:	Burges Magnavac 1000
2	Feed pump make-type (if applicable)	:	MCM O'DRILL 6 x 8
3	Driven by motor power	HP	100
4	Gas discharging line I.D.	in	1
5	Discharging Line running to	:	In safe area
6	Degasser sound-proofed	yes/no	No
11 MUD-GAS SEPARATOR			
1	make and type	:	WEI
2	Mud-Gas Separator O.D. body	in	48
3	Mud-Gas Separator Height	m	4558 (mm)
4	Gas Treatment capacity	Sm ³ /d	
5	Liquid Treatment capacity	lt/min	1000 lt/min
6	Max Operating Working Pressure	psi	100
7	Mud-Gas discharge line O.D	in	10"
8	Mud-Gas discharge running to	:	In safe area
9	Bottom Liquid Seal height	m	3
10	H2S Service	yes/no	Yes
11	Complete with pressure gauge	yes/no	Yes
12 TRIP TANK			
1	Capacity	m ³	5
2	Liner capacity	lt/cm	11.5
3	Level indicator type	:	Electronic
4	Visible from driller's site	yes/no	Yes
5	Trip tank complete with level recorder	yes/no	Yes (see Rig Sense)
6	Trip tank feed pump make-type	:	MCM O'DRILL 3" x 4"
7	Flow rate	lt/min	No

1.14 LINES FOR CEMENTING JOBS

.1 HIGH PRESSURE CEMENTING LINES			
H.P. Fixed Line Running from Rig			
1	Floor down nearby Cement Unit location	yes/no	Yes
2	H.P. Fixed Line quantity	No.	2
3	Inside Diameter and W.P.	in-psi	2-10000
4	End Connection type	:	Weco Union Fig. 1502
.2 WATER SUPPLYING LINE			
1	Quantity	No.	1
2	Inside Diameter and W.P.	in	4
3	End Connection type	:	Quick Clamp
.3 MUD SUPPLYING LINE			
1	Mud Supplying line to Cement Unit area.	No.	1
2	Inside Diameter and W.P.	in	4
3	End Connection type	:	Quick Clamp

1.15 WELL CONTROL EQUIPMENT

1.15.1 DIVERTER SYSTEM

.1 ANNULAR DIVERTER

1	Make and type	:	T3 Energy Services -BOP Mod. 7082
2	Size and working pressure	in- psi	21 ¼ 2K
3	Top connection type	:	studded
4	Top connection size	in- psi	21 ¼ 2K
5	Bottom connection Type	:	Flanged
6	Bottom Connection Size	in- psi	21 ¼ 2K

.2 BOP DIVERTER SPOOL

1	Quantity	:	1
2	Top connection type	:	Flanged
3	Top connection size	in- psi	21 ¼" 2000
4	Bottom connection Type	:	Flanged
5	Bottom Connection Size	in- psi	21 ¼" 2000
6	Outlets	:	2
7	Outlets size	in- psi	10 -500

.3 BOP DIVERTER VALVES

1	Diverter flow line valves	no	1	1 as kill line
2	Diverter flow line valves make type	:	Hydraulic ball valve	Lo Torq
3	Diverter flow line valves size	in- psi	10" - 500	2"1/16- 10k
4	Bottom connection Type	:		

.4 BOP DIVERTER DISCHARGE LINE

1	Diverter flow lines	No.	1
2	Diverter flow lines type	:	Rigid steel
3	Diverter flow lines size	in- psi	10 - 500
4	Diverter flow lines running to	:	In safe area (corral)
5	Diverter flow lines running to	:	

1.15.2 13.5/8-5.000 BOP STACK

.1 BAG PREVENTER

1	Quantity	No.	1
2	Make and type	:	T3 Energy Service U mod. 7022
3	Size and working Pressure	in- psi	13 5/8" - 5000
4	H ₂ S service	:	Yes
5	Top connection type	:	Studded
6	Top connection size	in- psi	13 5/8" - 5000
7	Bottom connection Type	:	Flanged
8	Bottom Connection Size	in- psi	13 5/8 - 5000

**CONTRACTOR'S
OFFER**

9	Built as per API specification	:	API 16A (ISO 13553)		
.2 DOUBLE RAM PREVENTER					
1	Quantity	No	1		
2	Make and type	:	T3 Energy service Mod. U		
3	Size and working Pressure	in-psi	13 5/8" 10000		
4	H ₂ S service	:	Yes		
5	Ram lock Type	:	Manual		
6	Top connection type	:	Flanged		
7	Top connection size	in-psi	13 5/8" 10000		
8	Bottom connection Type	:	Flanged		
9	Bottom Connection Size	in-psi	13 5/8" 10000		
10	Outlets Connection Type	:	Flanged		
11	Outlet Connection size (on one side)	in-psi	3" 5000 for choke		
12	Outlet Connection size(on the other side)	in-psi	2" 5000 for kill		
13	Shear Bonnet	type	No. See single		
14	Capable to cut max drill pipe in use even with the MAWHP (maximum anticipated wellhead pressure) applied on it in compliance with the API Standard 53.	:	No. See single		
15	Built as per API specification	No.	API 16A		
.2.1 SINGLE RAM PREVENTER					
1	Quantity	No	1		
2	Make and type	:	T3 Energy service Mod. U		
3	Size and working Pressure	in-psi	13 5/8" 10000		
4	H ₂ S service	:	Yes		
5	Ram lock Type	:	Manual		
6	Top connection type	:	Flanged		
7	Top connection size	in-psi	13 5/8" 10000		
8	Bottom connection Type	:	Flanged		
9	Bottom Connection Size	in-psi	13 5/8" 10000		
10	Outlets Connection Type	:	Flanged		
11	Outlet Connection size (on one side)	in-psi	3" 5000 for choke		
12	Outlet Connection size(on the other side)	in-psi	2" 5000 for kill		
13	Shear Bonnet	type	Yes		
14	Capable to cut max drill pipe (OD Grade)	:	Capable to shear DP 5" S135		
15	Built as per API specification	No.	API 16A		
.3. BOP PIPE RAMS					
.3.1 Fixed Pipe Rams					
1	Quantity	No.	2	1	
2	Size	in	5"	3.5"	
3	Ram packer	type	T3	T3	
3.1a Fixed Pipe Rams					
1	Quantity	No.	2	1	1
2	Size	in	3.1/2	2.7/8	2.3/8

CONTRACTOR'S OFFER

3	Ram packer	type	T3	
3.2 Variable Pipe Rams				
1	Quantity	No.	1	1
2	Size	in	2.7/8- 5	4.5-7
3	Ram packer	type	T3 U Model	
3.3 Casing Rams				
1	Quantity	No.	1	
2	Size	in	9.5/8-in	
3	Ram packer	type	T3	
3.4 Casing Rams				
1	Quantity	No.	1	
2	Size	in	7-in	
3	Ram packer	type	T3	
3.6 Shear/Blind Rams				
1	Quantity	No.	1	
2	Type	type	SBR	
3	Capable to cut max drill pipe (OD Grade)	:	5-in 19,5 lb/ft S-135	

1.15.3 CHOKE & KILL VALVES ON BOP STACK

.1 CHOKE VALVES				
1,1 Hydraulic Operated Valve				
1	Choke valves Quantity	No.	2	
2	Choke valves make and type	:	Cameron "FLS"	
3	H ₂ S service	:	Yes	
4	Built as per API specification	:	ISO 10423	
5	Choke valves connection type	:	Flanged	
6	Choke valves connection size	in-psi	3 1/16" 10K	
1,2 Manual Operated Valve				
1	Choke valves Quantity	No.	2	
2	Choke valves make and type	:	Cameron "FLS"	
3	H ₂ S service	:	Yes	
4	Built as per API specification	:	ISO 10423	
5	Choke valves connection type	:	Flanged	
6	Choke valves connection size	in-psi	3 1/16" 10K	
.2 KILL VALVES				
2,1 Hydraulic Operated Valve				
1	Kill valves Quantity	No.	2	
2	make and type	in	Cameron "FLS"	
3	H ₂ S service	:	Yes	
4	Built as per API specification	:	ISO 10423	
5	Kill valves connection type	:	Flanged	
6	Kill valves connection size	In-psi	2 1/16" 10K	
2,2 Manual Operated Valve				
1	Kill valves Quantity	No.	2	
2	make and type	in	Cameron "FLS"	

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3	H ₂ S service	:	Yes
4	Built as per API specification	:	ISO 10423
5	Kill valves connection type	:	Flanged
6	Kill valves connection size	In-psi	2 1/16" 10K

1.15.4 WELL HEADS & ADAPTERS

.1 13 5/8 DRILLING / SPACER / RISER SPOOL

1	Quantity	No.	4 (600 mm each)
2	H ₂ S service	:	No
3	Top connection type	:	Flanged
4	Top connection size	in-psi	13 5/8" 10K
5	Bottom connection Type	:	Flanged
6	Bottom Connection Size	in-psi	13 5/8" 10K
7	Outlets	No.	
8	Outlets Connection Type	:	
9	Outlets Connection size	in-psi	
10	Total Height	m	

.2 ADAPTER SPOOL to connect BOP with Well Head spools

1	Quantity	No.	1 + 1 spare	1 + 1 spare
2	Top connection size	in-psi	13.5/8" 10K	13.5/8" 10K
3	Top connection type	:	studded	studded
4	Bottom Connection Size	in-psi	13.5/8"-3K	11"-3K
5	Bottom Connection type	:	studded	studded

.3a ADAPTER SPOOL to connect BOP with Well Head spools

1	Quantity	No.	1 + 1 spare	1
2	Top connection size	in-psi	13.5/8" 10K	13.5/8" 10K
3	Top connection type	:	studded	studded
4	Bottom Connection Size	in-psi	9"-3K	7.1/16"-2K
5	Bottom Connection type	:	studded	studded

.3b ADAPTER SPOOL to connect BOP with Well Head spools

1	Quantity	No.	1 + 1 spare	1
2	Top connection size	in-psi	13.5/8" 10K	13.5/8" 10K
3	Top connection type	:	studded	studded
4	Bottom Connection Size	in-psi	7.1/16"-3K	7.1/16"-5K
5	Bottom Connection type	:	studded	studded

1.15.5 KILL & CHOKE LINES

.1 KILL LINES from BOP outlets to KILL MANIFOLD

1	Kill line	No.	2
---	-----------	-----	---

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2	Kill line type	:	Rigid Steel/chiksan
3	Built as per API specification	:	API 16C
4	H ₂ S service	:	Yes
5	Kill line Inside diameter-W.P.	In-psi	2" 10K
.2 CHOKE LINES from BOP Outlets to CHOKE MANIFOLD			
1	Choke line	No.	2
2	Choke line type	:	Rigid steel (flanged/hub)
3	Built as per API specification	:	API 16 C
4	H ₂ S service	:	Yes
5	Choke line Inside diameter-W.P.	in-psi	3" 10K

1.15.6 KILL & CHOKE MANIFOLD

.1 KILL MANIFOLD DESCRIPTION			
1	kill manifold location	:	Yes
2	Kill manifold size	In-psi	ID as kill lines
3	Kill manifold valves quantity	No.	10000
4	Valves make type	:	4
5	First Inlet connected with	:	Cameron FLS
6	Second Inlet connected with	:	Rig Floor Mud Manifold
5	First Outlet connected with	:	Weco Union Fig 1502
6	Second Outlet connected with	:	Yes
.2. CHOKE MANIFOLD GENERAL			
1	Choke manifold assembled by	:	Cameron
2	Choke manifold H ₂ S service	yes/no	Yes
	Choke manifold Size	in-psi	3 1/16" 10000
3	Built as per API specification	:	API 16C
4	All Connection ends not Threaded	yes/no	Yes
.2.1 Choke Manifold High Pressure Section			
1	Inside diameter-W.P.	in-psi	3 1/16" 10000
2	Inlet Points	No.	3
3	Provision to connect the pressure Sensor of Mud Logging Unit	yes/no	Yes
.2.2 Power adjustable Choke Valve			
1	Quantity	No.	1
2	Make type	:	Cameron
3	Size and W.P.	In-psi	3" - 10000
.2.3 Manual adjustable Choke Valve			
1	Quantity	No.	2
2	Make type	:	Cameron
3	Size and W.P.	In-psi	3" - 10000
.2.4 Valve Upstream each Choke Valve			
.2.4.1 Valve Hydraulic Operated			
1	Quantity	No.	1
2	Make type	:	Cameron FLS
3	Size and W.P.	in-psi	3 1/16"10000

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.2.4.2 Valve Manual Operated

1	Quantity	No.	1
2	Make type	:	Cameron FLS
3	Size and W.P.	in-psi	3 1/16"10000

Choke manifold

.2.5 Lower Pressure Section (Buffer Tank)

1	Inside diameter-W.P.	In-psi	3 1/16" 10000
2	Outlet points	No.	4
3	each with exclusion valve size	in-psi	Yes, 3 1/16" 10K

.2.6 Outlet to mud gas Separator

1	Quantity	No.	1
2	Valve Size and W.P.	in-psi	3 1/16" 10000
3	Connecting Line Type	:	Flexible/rigid

.2.7 Outlet to Flare Line

1	Quantity	No.	1
2	Valve Size and W.P.	in-psi	3 1/16" 10000

.2.8 Outlet to Waste Pit

1	Quantity	No.	1
2	Valve Size and W.P.	in-psi	3 1/16" 10000

.2.9 Outlet to shale shakers

1	Quantity	No.	1
2	Valve Size and W.P.	in-psi	3 1/16" 10000

.3. FLARE LINES

1	Quantity	No.	1
2	Flare Line OD x ID x length	in-m	3" x 120 m
3	Complete with remote Ignition system	yes/no	Yes
4	Ignition system type	:	CE Mod E21 RCAB

.4. System to adjust the Height of Choke Manifold Skid

1	Installed	yes/no	No
2	Hydraulic Operated	yes/no	

.5. REVERSE CIRCULATING LINE

1	Line running from rig floor to choke manifold.	No.	1
2	Reverse circulating line I.D. x w. p.	in-psi	2"
3	H ₂ S service	:	5000
4	Rig floor end connection type	:	Yes
5	Complete with pressure Gauge	yes/no	Weco union

.6. Power Choke Control Panel

1	Make type	:	Cameron
2	Location	:	Rig Floor
3	Comply with the API 16-C Requirements	yes/no	Yes

1.15.7 HIGH PRESSURE AUXILIARY TOOLS

.1 CHICKSAN JOINTS

1	Chicksan joints	No.	10 - 2" - 10000
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2	Chicksan joints	in-psi	Fast/FMC			
3	Make and type	:	API 16C			
4	H ₂ S service	yes/no	Yes			
.2 CASING CUP TESTERS						
1	Quantity	No.	1	1	1	1
2	Make and type	:	Came ron	Came ron	Came ron	Came ron
3	Cups for casing size	:	13"3/ 8	9.5/8 -	7" -	5" -
4	Cups for casing weight	:	61- 68	43.5- 47	32- 29- 26- 23	15- 18
3 CROSS OVER SUB FOR CASING RAM TESTER						
3.2 For 9.5/8" Casing RAM						
1	Quantity	No.	1			
2	Drill Pipe Top connection	type	(integral testing tool Pin/Box NC50 For 9.5/8" csg)			
3	casing Bottom Connection	type				
3.3 For 7" Casing RAM						
1	Quantity	No.	1			
2	Drill Pipe Top connection	type	(integral testing tool Pin/Box NC50 For 7" csg)			
3	casing Bottom Connection	type				
.4. CROSS OVER SUB TO TEST TOP DRIVE INSIDE BOP VALVES						
1	Quantity	No.	1	1		
2	Top connection type	:	Box NC-38	Box NC-50		
3	Bottom Connection type	:	Weco Union	Weco Union		
.5. BOP TESTING UNIT						
5.1 POWER OPERATED TESTING UNIT						
1	Quantity	No.	1			
2	Make and type	:	Stew. & Stev or eq.			
3	Maximum working pressure	psi	10000			
4	High flow rate	l/min	1			
5	Low flow rate	l/min	0.5			
6	Chart recorder type	yes/no	Yes			
5.2 MANUAL OPERATED TESTING UNIT						
1	Quantity	No.	1			
2	Make and type	:				
3	Maximum working pressure	psi	10000			

1.15.8 BOP AND DIVERTER CONTROL SYSTEM

.1 ACCUMULATOR UNIT	
1	Make and Type : CAD Control system

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2	The Unit complies with API std 16-D	yes/no	Yes	
3	Oil reservoir capacity	gal	580 gal	
4	Total bottle Installed	No	38	
5	Nominal capacity of each	gal	9.5	
6	Total nominal capacity	gal	361	
7	Max. working pressure	psi	3000	
8	Accumulator unit installation site	:	In safe area	
.2 ELECTRICAL RECHARGING PUMP				
1	Quantity	No	1	
2	make type	:	Union pump serie 60	
3	Flow rate	gal/min	Able to recharge, with air-driven pumps the accumulator unit in 15 min	
4	Max working Pressure	psi	3000	
5	Pump driving by motor power	HP	20	
6	Motor driven also by emergency Generator	yes/no	Yes	
.3 AIR-DRIVEN RECHARGING PUMP				
1	Quantity	no	2	
2	make type	:	Muffler pneumatic pump	
3	Flow rate	gal/min	Able to recharge, with electrical-driven pumps the accumulator unit in 15 min	
4	Max working Pressure	psi	3000	
5	Air Supplying pressure	psi	80	
.4 ACCUMULATOR UNIT CONTROL MANIFOLD				
1	Number of Control Valves	No	8 + 3 hydraulic valves upstream each choke)	
2	Control valve type	:	4 ways selector	
3	Low/High pressure by-Pass valve	yes/no	Yes	
4	Annular Pressure regulator remote controlled	yes/no	Yes	
5	Manifold Pressure regulator remote controlled	yes/no	No	
.5 BOP CONTROL HOSES				
1	Control hoses	No	16	16
2	Inside diameter	in	1	1
3	Control hoses Certified Fire resistant	type:	Rigid type	Flexible type
		yes/no		Yes
.6 DIVERTER CONTROL HOSES				
1	Quantity	No	2	
2	Inside diameter	in	1 1/2"	
3	Certified Fire resistant	yes/no	Yes	
.7 B.O.P. DRILLER'S CONTROL PANEL				
1	Installation site	:	CAD - On rig floor	
2	Graphic display of BOP configuration	yes/no	Yes	
3	With Lights for activated functions	yes/no	Yes	

CONTRACTOR'S OFFER

4	Certified for classified area	yes/no	Yes
.7.1 Alarms at Driller's site			
1	Low oil pressure visual and sound alarm	yes/no	Yes
2	Low air pressure visual and sound alarm	yes/no	Yes
3	Low fluid level visual and sound alarm	yes/no	Yes
.8. TOOL-PUSHER B.O.P CONTROL PANEL			
1	Installation site	:	No
2	Graphic display of BOP configuration	yes/no	
3	With Lights for activated functions	yes/no	
.9. CLOSING TIME OF PREVENTERS			
1	Closing time of 20 Bag Preventer	s	45
2	Closing time of 13.5/8 Bag preventer	s	30
3	Closing time of all Ram preventers	s	30
10 EMERGENCY BACK UP SYSTEM			
1	Installed	yes/no	
2	Supply air pressure to accumulator unit control manifold	yes/no	Yes
3	Supply air pressure to Driller's BOP control panel	yes/no	Yes

1.16 DOWN HOLE TUBULAR MATERIAL

1.16.1 TUBULARS

.1. DRILL PIPES FOR 8 1/2-in HOLE			
1	Drill Pipes OD	in	5
2	API steel grade	:	S135
3	Total Length	m	2500
4	Length of each joint (range)	:	III
5	Nominal Weight	lb/ft	19.5
6	Internal Plastic Coating	type	Yes
7	Tool joint OD x ID	in x in	6.5/8 x 2.3/4
8	Tool Joint hardbanding	type	No hardbanding
9	Tool Joint connections type and size	type	API NC-50
10	Condition classification at the begging of the contract		New or Premium
.2. DRILL PIPES FOR 6-in HOLE			
1	Drill Pipes OD	in	3 1/2
2	API steel grade	:	S 135
3	Total Length	m	2500
4	Length of each joint (range)	:	III
5	Nominal Weight	lb/ft	15.5
6	Internal Plastic Coating	type	Yes
7	Tool joint OD x ID	in x	4 3/4" x 2

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- 8 Tool Joint hardbanding
- 9 Tool Joint connections type and size
- 10 Condition classification at the begging of the contract

in	7/16"	
type	No hardbanding	
type	No hardbanding	
	New or Premium	

.3. DRILL PIPES PUP JOINTS

- 1 Drill Pipes OD
- Quantity
- 2 API steel grade
- 3 Length
- 4 Nominal Weight

in	5	
No.	Two each	
type	S-135	
m	2m	
lb/ft	19.50#	

.3.1 DRILL PIPES PUP JOINTS

- 1 Drill Pipes OD
- Quantity
- 2 API steel grade
- 3 Length
- 4 Nominal Weight

in	3.1/2	
No.	Two each	
type	S-135	
m	2m	
lb/ft	15.5#	

.4. HEAVY WALL DRILL PIPES FOR 8 1/2-in HOLE

- 1 HWDP OD
- 2 Body type: Integral or welded
- 3 Steel grade
- 4 Quantity of Joints
- 5 Length of each
- 6 Nominal Weight
- 7 Internal Plastic Coating
- 8 Tool joint OD x ID
- 9 Tool Joint hardfacing
- 10 Tool Joint API connections type and size
- 11 Condition classification at the begging of the contract

in	5	
:	Friction welded	
:	AISI 1340	
No.	15	
m	9.1	
lb/ft	50	
type	No	
in x in	6 5/8" x 3"	
type	Fine	
type	NC50	
:	Premium	

.5. HEAVY WALL DRILL PIPES FOR 6-in HOLE

- 1 HWDP OD
- 2 Body Integral or welded type
- 3 API steel grade
- 4 Quantity of Joints
- 5 Length of each
- 6 Nominal Weight
- 7 Internal Plastic Coating
- 8 Tool joint OD x ID
- 9 Tool Joint hardfacing
- 10 Tool Joint API connections type and size
- 11 Condition classification at the begging of the contract

in	3.5	
:	Friction welded	
:	AISI 1340	
No.	15	
m	9.1	
lb/ft	26	
type	No	
in x in	4 3/4" x 2 3/16"	
type	Fine	
type	NC38	
:	Premium	

1.16.2 DRILL COLLARS

1 DRILL COLLARS COMMON FEATURES			
1	All the drill collars with Elevator recess	yes/no	
2	All the drill collars with standard length of 31 ft	yes/no	Yes
3	All the drill collars with slip recess	yes/no	Yes
4	All the drill collars with elevator recess	yes/no	No
5	All the drill collars with Bore-back on box	yes/no	Yes
6	All the drill collars with Stress Relief Groove on pin	yes/no	Yes
.2. DRILL COLLARS DIMENSIONS			
2.1. Drill Collars			
1	Outside Diameter	No.	10
2	Inside Diameter	in	6.1/2
3	Outside body	in	2 13/16"
4	API connection	type	Spiral
		type	6.5/8 Reg NC50
2.2 Drill Collars			
1	Outside Diameter	No.	15
2	Inside Diameter	in	4.3/4
3	Outside body	in	2 1/4"
4	API connection	type	Spiral
		type	NC38
.3. SHORT DRILL COLLARS			
1	Outside Diameter	No.	2
2	Inside Diameter	in	6.1/2
3	Length of each joint	in	2 13/16"
4	API connection	m	2
		type	6.5/8 Reg NC50
.3.1 Short Drill Collars			
1	Outside Diameter	No.	2
2	Inside Diameter	in	4.3/4
3	Length of each joint	in	2 1/4"
4	API connection	m	2
		type	NC38

1.16.3 OTHER DOWN HOLE TOOLS

.1. BIT AND CROSS-OVER SUBS			
1	Quantity of each X-Over sub to connect and run in hole all the Contractor's furnished drill and fishing strings	:	2 each type and diameter
2	All X-Overs with Boreback on box	yes/no	Yes
3	Stress Relief groove on pin	yes/no	Yes
.1.1 Other X-Overs			
1	Top connection	No.	2
2	Bottom connection	type	NC-50 Box
		type	NC-38 Pin

1.16.4 DRILL STRING INSIDE PRESSURE CONTROL TOOLS

.1. DRILL STRING CIRCULATING HEAD

	No.	1	1
1 For DP outside diameter	in	3.1/2"	5"
2 Bottom connection	type	NC-38	NC-50
3 Top connection	type	2" Weco	2" Weco
4 Top valve	type	LO-torque	LO-torque
5 Working pressure	in-psi	2"- 10,000	2"- 10,000

.2. FULL OPENING SAFETY VALVE (Lower Kelly Cock)

	No.	1	1
1 Quantity	type	NC 38	NC 50
2 For DP connection	make	TIW	TIW
3	type	KC	KC
4 Outside diameter	in	4 3/4"	6 5/8"
5 Inside diameter	in	2"	2 3/4"
6 Working pressure	psi	5000	5000

.3. INSIDE BOP VALVE

	No.	1	1
1 Quantity	:	NC-50	NC-38
2 make type	in	5	3.5
3 Outside Diameter	type	5000	5000
4 For DP connection	psi		
5 Rated Working pressure			

.4. DROP-IN VALVE

	No.	1	1
1 Quantity	type	5" DP	3.1/2" DP
2 For DP connection	:	Hydril	Hydril
3 make	:	Check guard	Check guard
4 type	in	2 5/8"	2 1/8"
5 Min. Inside drill string diameter	No.	2	2
6 Landing Sub	Yes/No	Yes	Yes
7 Complete with retrieving tool			

.5. FLOAT VALVES

	No.		1
1 Float Valves	type		6.5/8 Reg
2 For DC connection	:		Baker
3 make	:		GA
4 type			
	No.	1	1
1 Float Valves	type	NC-50	NC-38
2 For DC connection	:	Baker	Baker
3 make	:	GA	GA
4 type			

1.17 DRILL PIPES/DRILL COLLARS HANDLING TOOLS

1.17.1 POWERED AND MANUAL SLIPS

.1. MULTI-SIZED POWERED PIPE SLIPS

	No.	
1 Quantity	No.	See 5.21.1.2

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2	make	:	
3	type	:	
4	For Drill Pipe size range	in	
5	For Drill Collars size range	in	
6	For Casing size range	in	
7	For Tubing size range	in	
8	Load rating	t	
2. DRILL PIPE POWER SLIPS			
1	Quantity	No.	Drillmec
2	make	:	
3	type	:	Remote operated
4	Pipe size range	in	5"-3.1/2"
.3. MANUAL SLIPS			
.3.1 Drill Pipe Manual Slips			
.			un solo slips per diametro come back up al sistema automatico
1		No.	1
2	make	:	VARCO BJ or eq
3	type	:	SDXL
4	For O.D. Drill pipes	in	5
.3.2 Drill Pipe Manual Slips			
.			un solo slips per diametro come back up al sistema automatico
1		No.	1
2	make	:	VARCO BJ or eq.
3	type	:	SDXL
4	For O.D. Drill pipes	in	3.1/2
.3.3 Drill Collar Slips			
.			
1		No.	2
2	make	:	BR
3	type	:	C
4	For O.D. Drill Collars	in	8"
.3.4 Drill Collar Slips			
1		No.	2 2
2	make	:	BR BR
3	type	:	C C
4	For O.D. Drill Collars	in	6.1/2" 4.3/4
3.5. Safety Clamps			
1		No.	2
2	make	:	BR
3	type	:	C
4	For O.D. range	in	3 3/4" - 11 5/8"

1.17.2 POWERED /MANUAL TONGS

1. POWER TONGS			
1.1 Combination Of Automatic Spinning & Power Tong			
1	Make	:	1
2	Type	:	Drillmec Power tong
3	For O.D. Tubular size range	In-in	3 1/2 " - 11"
4	Make-Up torque	ft.lbs	118.000 ft.lb

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5	Break-out Torque	ft.lbs	118.000 ft.lb
6	Spin Torque	ft.lbs	Suitable for 3.5-5" Dp
1.2 Spinning Wrench			
1	make	:	See 5.21.2.1.1
2	type	:	
3	For O.D. Tubular size range	In-in	
.2 MANUAL ROTARY TONGS			
1	Quantity	No.	Automatic system-Power tong (disponibile solo n°1 Rotary tong con funzione di ritegno per avvitamento dei primi giunti per csg con diametro superiore a 9" 5/8. g- 55000 ft.lbs)
2	make	:	
3	type	:	
4	For O.D. Tubular	in	
5	Max. rating Torque	ft.lbs	
2.1 Manual Rotary Tongs			
1	Quantity	No.	Automatic system-Power tong (disponibile solo n°1 Rotary tong con funzione di ritegno per avvitamento dei primi giunti per csg con diametro superiore a 9" 5/8. g- 55000 ft.lbs)
2	make	:	
3	type	:	
4	For O.D. Tubular	in	
5	Max. rating Torque	ft.lbs	

1.17.3 PIPE ELEVATORS

.1. DRILL PIPES ELEVATORS			
1.1	All the pipes elevators with API STD 8-C	Yes/No	Yes
.2. DRILL PIPES ELEVATORS			
1	Quantity	No.	Unconventional rig: Automatic pipe handling system. N.1 solo elevatore come back up 1 as spare
2	make	:	Varco BJ
3	type	:	RG
4	For O.D. Drill pipes	in	5
5	Max. rating Load Capacity	t	225
2.1 Drill Pipes Elevators			
1	Quantity	No.	Unconventional rig: Automatic pipe handling system. N.1 solo elevatore come back up 1 as spare
2	make	:	Varco BJ
3	type	:	RG
4	For O.D. Drill pipes	in	3 1/2"
5	Max. rating Load Capacity	t	135

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**.2. DRILL COLLAR LIFT SUB
ELEVATORS**

- 1 Quantity
- 2 For O.D. Drill Collars
- 3 Bottom connection

No.	1 each DC	1 each DC
in	8"	6.1/2"
type	6 5/8" Reg	NC 50

.2.1 Drill Collars Lift Sub Elevators

- 1 Quantity
- 2 For O.D. Drill Collars
- 3 Bottom connection

No.	1 each DC	
in	4.3/4	
type	NC 38	

1.17.4 AUXILIARY TOOLS

.1 Bit Breaker

- 1 For Bit size
- 2 For Bit size

in	16" - 12.1/4" - 8.1/2" - 6"
in	

.2 Bit Gauge

- 1 For Bit size
- 2 For Bit size

in	16" - 12.1/4" - 8.1/2" - 6"
in	

3 Tri-point calliper

- 1 For O.D. blade stabilizers
- 2 Accuracy

In	16" - 12.1/4" - 8.1/2" - 6"
In	1/64"

1.18 CASING & TUBING HANDLING TOOLS

1.18.1 CASING HANDLING TOOLS

**.1 CASING SLIPS FOR ROTARY
TABLE**

.1.1 Casing Slips for Rotary Table

- 1 Quantity
- 2 make
- 3 type
- 4 For O.D. Casing

No.	One each
:	BR or equiv.
:	UC 3
in	13.3/8" -9.5/8" - 7"- 5"

.2 CASING ELEVATORS

.2.1 Side Door Casing Elevators

- 1 Quantity
- 2 make
- 3 type
- 4 For O.D. Casing
- 5 Rated Load Capacity

No.	One each
:	Varco BJ or eq
type	SLX
in	13.3/8" -9.5/8" - 7"- 5"
t	136 t

**.3 SINGLE JOINT CASING
ELEVATOR**

.3.1 Single Joint Casing elevators

- 1 Quantity
- 2 make
- 3 type
- 4 For O.D. Casing

No.	1 each
:	Varco
:	SJ
in	13.3/8" - 9.5/8" - 7"- 5"

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.4. CASING TONGS

.4.1 Manual Casing tongs

- 1 Quantity
- 2 make
- 3 type
- 4 For O.D. Casing
- 5 Max Rated Torque

No. :
: B&V
: extended
in 13.3/8" - 9.5/8" - 7" - 5"
lb/ft

n.1 Chiave con funzione di ritegno per avvitemento dei primi giunti per csg con diametro superiore a 9" 5/8. Vedi anche Automatic Power Casing tongs

.4.2 Power Casing Tongs

- 1 Quantity
- 2 make
- 3 type
- 4 For O.D. Casing
- 5 Max Rated Torque

No. :
: Automatic Power Casing tongs: csg make-up device
: in 13 3/8" Ten ER, 10"3/4 Ten MS,
9 5/8" Ten MS, 7"5/8 Ten MS,
7" Ten MS, 5"1/2 Ten MS -5" Ten MS
lb/ft

5. CASING CIRCULATING HEADS

5.1 Casing Circulating Heads

- 1 Quantity
- 2 Top connection
- 3 Bottom connection
- 4 For O.D. Casing

csg make-up device able to circulate (max 70 bar) and ruotate during csg running.
13 3/8" Ten ER, 10"3/4 Ten MS,
9 5/8" Ten MS, 7"5/8 Ten MS,
7" Ten MS, 5"1/2 Ten MS -5" Ten MS

No.	1 (if avail able)			
type	2" LP	2" LP	2" LP	2" LP
type	TBD	TBD	TBD	TBD
in	13 3/8	9 5/8	7	5

6 CASING THREAD PROTECTORS

.6.1 Casing Thread Protectors

- 1 make
- 2 type
- 3 For O.D. Casing

No. Three
: Keplo
: air
in 13.3/8" - 9.5/8" - 7" - 5"

7 CASING DRIFT

7.1 Casing Drift

- 1 For O.D. Casing
- 2 For Casing Nominal weight

No.	1	1	1	
in	13"3/8	9"5/8	7"	
lb/ft	61	43.5-53.5	23-29	

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8 CASING SCRAPERS

- 1 Casing Scrapers
- 2 make
- 3 type
- 4 For O.D. Casing
- 5 For Casing Nominal weight

No.	1	1	
:	DM Best	DM Best	
:	Rotover	Rotover	
t	t	t	
in	9.5/8	7	
lb/ft	53.5	29	

.9 Casing Circulation Internal Packer to be used with Top Drive

- 1 Quantity
- 2 Top Connection
- 3 make
- 4 type
- 5 for casing size

No.	csg make-up device able to circulate (max 70 bar) and rotate during csg running. 13 3/8" Ten ER, 10 3/4 Ten MS, 9 5/8" Ten MS, 7 5/8 Ten MS, 7" Ten MS, 5 1/2 Ten MS -5" Ten MS		
type			
:			
:			
in			

1.18.2 TUBING HANDLING TOOLS

.1 TUBING SPIDERS

- 1 Tubing spiders quantity
- 2 Make and -type
- 3 For O.D. tubing
- 4 Rated load Capacity

No.	1	
:	BR open end	
in	3 1/2" - 2 7/8"	
t	- 2 3/8"	
	90	

.1a TUBING SPIDERS

- 1 Tubing spiders quantity
- 2 Make and -type
- 3 For O.D. tubing
- 4 Rated load Capacity

No.	See 5.22.2.1	
:		
in		
t		

.2 TUBING ELEVATORS

- 1 Tubing elevators quantity
- 2 Make and -type
- 3 For O.D. tubing
- 4 Rated load Capacity

No.	1	
:	BJ HYT or rq	
in	3 1/2" - 2 7/8"	
t	- 2 3/8"	
	90	

.2a TUBING ELEVATORS

- 1 Tubing elevators quantity
- 2 Make and -type
- 3 For O.D. tubing
- 4 Rated load Capacity

No.	See 5.22.2.2	
:		
in		
t		

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.3. JUNK SUBS

- 1 make
- 2 type
- 3 O.D. Body
- 4 I.D. body
- 5 For Hole size
- 6 Connections

No.	1	1
:	Ballerini	Ballerini
:	STD	STD
in	7 ¾"	5 ½"
in	3 ½"	2 ¼"
in	12.1/4"	8.1/2"
typ e	6 5/8" Reg	4 ½" Reg

.3.1 JUNK SUBS

- 1 make
- 2 type
- 3 O.D. Body
- 4 I.D. body
- 5 For Hole size
- 6 Connections

No.	1	
:	Ballerini	
:	STD	
in	4 ¼"	
in	1 ½"	
in	5.7/8"	
typ e	3 ½" Reg	

.4 JUNK BASKET (REVERSE CIRCULATION.)

- 1 make
- 2 type
- 3 Mill Shoe
- 4 O.D. Body
- 5 I.D. body
- 6 For Hole size
- 7 Connections

No.	1	1
:	Bowen	Bowen
:	Rev. circ	Rev. circ
typ e	C	C
in	11"	7 7/8"
in	89 mm	51 mm
in	12 ¼"	8 ½"
typ e	6 5/8" Reg	4 ½" Reg

.4.1 JUNK BASKET (REVERSE CIRCULATION.)

- 1 make
- 2 type
- 3 Mill Shoe
- 4 O.D. Body
- 5 I.D. body
- 6 For Hole size
- 7 Connections

No.	1	
:	Bowen	
:	Rev. Circ	
typ e	C	
in	5 1/8"	
in	68 mm	
in	5 7/8"	
typ e	3 ½" Reg	

.5 Junk Mill

- 1 Quantity
- 2 make
- 3 type
- 4 O.D. Body
- 5 I.D. body
- 6 Connections

No	1	1	1
:	Servco	Servco	Servco
:			Junk mill
in	11 ½"	8 1/8"	5 7/8"
in			
typ e	6 5/8" Reg	4 ½" Reg	3 ½" Reg

.6 Fishing Magnet

- 1 Quantity
- 2 make
- 3 type
- 4 O.D. Body

No	1	1	
:	Bowen	Bowen	
:			
in	10 ½"	7"	

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5	I.D. body	in			
6	Connections	type	Pin 6 5/8" Reg	NC 50	
.7 Impression Block					
1	Quantity	No	N/A	1	
2	make	:		Bowen	
3	type	:		Lead impression block	
4	O.D. Body	in		7	
5	I.D. body	in			
6	Connections	Type		3 1/2 Reg pin	

1.20 INSTRUMENTATION

1.20.1 INSTRUMENTATION AT DRILLER'S CONSOLE

.1 WEIGHT INDICATOR					
1	make	:		Wagner	
2	type	:		D50	
.2. PRESSURE INDICATOR					
2.1 Stand pipe Pressure Indicator					
1	Stand pipe pressure Gauge	No.	1		
2	make	:		MD TOTCO	
3	type	:		Hydraulic	
4	pressure range indicator	psi		0 - 350	
3 TORQUE INDICATOR					
3.1. Top Drive Torque indicator					
1	Make			MD TOTCO	
2	Type			Electronic	
3	Range	ft.lbs		40000	
.3.2 Rotary Table Torque indicator					
1	Make			MD TOTCO	
2	Type			Electronic	
3	Range	ft.lbs		20000	
.4 TOP DRIVE SPEED INDICATOR					
1	make	:		MD TOTCO	
2	type	:		Proximity	
3	Range	RPM		0 -200	
.4.1 Rotary Table Speed indicator					
1	make	:		MD TOTCO	
2	type	:		Proximity	
3	Range	RPM		0 - 200	

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.5 TONGS PULL INDICATOR

1	make	:	Yes
2	type	:	Analogic
3	Pull sensor	type	hydraulic
4	Range	lbs	55000 lb/ft

.6. STROKE COUNTER INDICATOR

.6.1 Mud Pump Stroke Counter Indicator

1	Quantity	No	One each pump
2	make	:	MD TOTCO
3	type	:	Proximity
4	Sensor	type	Digital

.6.2 Mud Pump Stroke Totalizer

1	make	:	One each pump
2	type	:	MD TOTCO
3	Sensor	type	Digital

.7. MUD PIT LEVEL INDICATORS & VOLUME TOTALIZER

1	make	:	MD TOTCO
2	type	:	Digital
3	Pit level sensors	type	Electronic /ultrasonic
4	Pit level sensors installed	No.	On each active tank
5	Pit Volume Totalizer	type	Digital
6	Totalizer Gain/loss alarm	yes/No	Audible and visual
7	Pit Volume Gain/loss Recorder	yes/No	Yes (digital)

.8 MUD FLOW RATE INDICATOR

1	make	:	MD TOTCO
2	type	:	Mud Flow Sensor
3	Flow rate sensor	type	Electronic
4	Flow rate gain/loss alarm	yes/No	Audible and visual

.9. TRIP TANK VOLUME INDICATOR

1	make	:	MD TOTCO
2	type	:	Electronic /ultrasonic
3	Pit Volume Gain/loss alarm	type	Audible and visual
4	Recorder	Yes/No	Yes

.10 Drilling Parameter Recorder

1	make	:	MD TOTCO
2	Conventional Pen recorder or Digital multitrack system	type	Digital monitor
2	Pens/ tracks quantity	No.	7 minimum
3	Pneumatic or electric	type	Electronic (dog house)
4	Suitable for hazardous area	:	
5	Parameter Recorded : ROP	:	Yes
6	Parameter Recorded: Weight on hook	:	Yes
7	Parameter Recorded. Top Drive speed	:	Yes
8	Parameter Recorded: Top drive torque	:	Yes

9	Parameter Recorded: Pump pressure	:	Yes
10	Parameter Recorded: SPM Pump 1	:	Yes
11	Parameter Recorded: SPM Pump 2	:	Yes
12	Parameter Recorded: SPM Pump 3	:	

1.20.2 INSTRUMENTATION INSIDE DRILLER'S DOG HOUSE

.1. DRILLING PARAMETER RECORDER			See 5.24.1.10
1	make		
2	Conventional Pen recorder or Digital multitrack system	type	
2	Pens/ tracks quantity	No	
3	Pneumatic or electric	type	
4	Suitable for hazardous area	:	
5	Parameter Recorded : ROP	:	
6	Parameter Recorded: Weight on hook	:	
7	Parameter Recorded. Top Drive speed	:	
8	Parameter Recorded: Top drive torque	:	
9	Parameter Recorded: Pump pressure	:	
10	Parameter Recorded: SPM Pump 1	:	
11	Parameter Recorded: SPM Pump 2	:	
12	Parameter Recorded: SPM Pump 3	:	

1.20.3 INSTRUMENTATIONS ON CHOKE CONTROL PANEL

.1 Drill Pipe Pressure Indicator			
1	Quantity	No.	1
2	Make and type	:	Cameron
3	Pressure Transducer type	:	J2
4	Pressure Reading range	:	0 – 400 (bar)
5	Pressure accuracy	:	2 (bar)
.2 Annulus Pressure Indicator			
1	Quantity	No.	1
2	Make and type	:	Cameron
3	Pressure Transducer type	:	J2
4	Pressure Reading range	:	0 – 700 (bar)
5	Pressure accuracy	:	4 (bar)
.3 Mud Pump Stroke Counter Indicator			
1	Quantity	No.	One each mud pump
2	Make and type	:	Cameron Digital
.4 Mud Pump Stroke Totalizer Indicator			
1	Quantity	No.	1
2	Make and type	:	Cameron digital
.5 Power Choke Opening Indicator			
1	Quantity	No.	1
2	Make and type	:	Cameron Analogic/pneumatic

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.6 Mud gas separator pressure gauge

- 1 Make and type :
2 Pressure accuracy psi

1.20.4 OTHER INSTRUMENTS

.1 Wire Line Unit (Slick Line)

- 1 Make and type :
2 Complete with tension indicator yes/no
3 Complete with depth indicator yes/no
4 Wire line Diameter and length in-m
5 Wire Line breaking strength kg
6 H2S service ;

No

.2 Drilling Deviation Measuring Device

- 1 Quantity no 1
2 Make and type : Totco
3 Deviation Range deg. 0 - 8 0 - 16

.3 Mud Testing Portable Unit

- 1 Quantity no 1
2 Make and type : BAROID P.n. 82100

.4 Calibrated Pressure Gauges

- 1 Quantity no 1
2 Make and type : Nuova Fima
3 Pressure Range : 0 - 10000 (psi)

.5 Personal Computer

- 1 Quantity no 1
2 Make and type :

.6 Computer printer

- 1 Quantity no 1
2 Make and type :

1.21 SAFETY EQUIPMENT

1.21.1 FIXED GAS MONITORING SYSTEM

.1 FIXED H₂S GAS MONITORING SYSTEM

- 1 Make and type :

.2 FIXED COMBUSTIBLE GAS MONITORING SYSTEM

- 1 Make and type :

.3 PORTABLE H₂S GAS DETECTORS

- 1 Quantity No 2
2 Make and type : MSA
3 Tube for H₂S measuring Q.ty & range n°-ppm electronic

- n°-ppm Lo strumento copre tutti i range richiesti

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Tube for SO-2 measuring range

n°- ppm	
n°- ppm	
n°- ppm	
n°- ppm	

.4 PERSONAL H₂S GAS DETECTORS

- | | | | |
|---|---------------|----|-----------------------|
| 1 | Quantity | no | 2 |
| 2 | Make and type | : | MSA pulsar H2s 10 ppm |

.5 PORTABLE EXPLOSIVE GAS DETECTORS

- | | | | |
|---|---------------|----|---------------|
| 1 | Quantity | no | Vedi 5.25.1.3 |
| 2 | Make and type | : | |

1.21.2 PERSONAL PROTECTIVE EQUIPMENT

.1 ESCAPE AIR BREATHING APPARATUS

- | | | | |
|---|----------------|-----|--------|
| 1 | Quantity | No | 30 |
| 2 | Make and Type | : | Drager |
| 3 | Breathing time | min | 10 |

.2 SELF CONTAINED BREATHING APPARATUS

- | | | | |
|---|----------------|-----|------------|
| 1 | Quantity | No | 15 |
| 2 | Make and Type | : | MSA |
| 3 | Breathing time | min | 7 (30 min) |

2.1 Spare breathing Bottles

- | | | | |
|---|----------|----|------------|
| 1 | Quantity | No | 30 bottles |
| 2 | capacity | lt | 7 (30 min) |

.3. BREATHING APPARATUS BOTTLES RECHARGING AIR COMPRESSOR

- | | | | |
|---|---------------|---|--------------------------|
| 1 | Make and type | : | 1
Drager - Junior N2B |
|---|---------------|---|--------------------------|

.4. PERSONAL PROTECTIVE EQUIPMENT

- | | | | |
|----|----------------------------|----|--------------------------|
| 1 | Fireman Suit | No | 2 |
| 2 | Fire-Proof blanket | No | 1 |
| 3 | Fire Proof Gloves | No | 2 |
| 4 | Safety belts | No | 3 |
| 5 | Safety Helmets | No | 1 each person |
| 6 | Safety Helmet for visitors | No | 10 |
| 7 | Safety Boots | No | 1 each person |
| 8 | Chemical Proof Gloves | No | 4 paia |
| 9 | Chemical Proof Boots | No | 1 each person |
| 10 | Chemical proof Apron | No | 3 |
| 11 | Eye shields | No | 1 each person + 10 spare |
| 12 | Full Face visors | No | 4 |

.5 FIRST AID EQUIPMENT

- | | | | |
|---|-------------------------|----|-----------|
| 1 | Quantity | no | 1 |
| 2 | First aid Kits location | : | TP Office |

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.6. RESUSCITATOR

1	Quantity	no	2
2	type	:	AMBU Type RFB

.7 FIRST AID STRETCHER

1	Quantity	no	2
2	Location	:	Tool Pusher Office

.8. EYES WASHING STATIONS

1	Quantity	No.	3
2	Location	:	Rig Floor – Mud Pits Area

.9 EMERGENCY SHOWER STATIONS

1	Quantity	No.	2
2	Location	:	Dressing Barack

.10 OTHER SAFETY EQUIPMENT

1	Wind socks	No.	2
2	Expl. Proof Electrical light Torch	No.	5
3			

1.22 FIRE FIGHTING EQUIPMENT

.1. FIRE FIGHTING EQUIPMENT

1.1 Fire water pumps

1	Quantity	No.	No
2	make-type	:	
3	Fire water pump flow rate	lt/m	

1.2 Fire fighting stations: diesel fuel storage area

1	Fire hoses	No.	no
2	Portable extinguishers	No.	2
3	Portable extinguisher Capacity	kg	50
4	Extinguishing material type	:	Powder

1.3 Fire fighting stations: diesel Engine-generator area

1	Fire hoses	No.	No
2	Portable extinguishers	No.	1
3	Portable extinguisher Capacity	kg	50
4	Extinguishing material type	:	Powder

1.4 Fire fighting stations: Power Control Cabin (PCR)

1	Fire hoses	No.	No
2	Portable extinguishers	No.	1
3	Portable extinguisher Capacity	kg	50
4	Extinguishing material type	:	Co2

1.5 Fire fighting stations: Mud tanks area

1	Fire hoses	No.	1
2	Portable extinguishers	No.	1
3	Portable extinguisher Capacity	kg	9
4	Extinguishing material type	:	Powder

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1.6 Fire fighting stations: Mud pump area

1	Fire hoses	No.	1 (See Above)
2	Portable extinguishers	No.	2
3	Portable extinguisher Capacity	kg	9 (kg)
4	Extinguishing material type	:	Powder

1.7 Fire fighting stations: BOP Accumulator area

1	Fire hoses	No.	No
2	Portable extinguishers	No.	2
3	Portable extinguisher Capacity	kg	12 (Kg)
4	Extinguishing material type	:	Powder

1.8 Fire fighting stations: Rig floor area

1	Fire hoses	No.	No
2	Portable extinguishers	No.	2
3	Portable extinguisher Capacity	kg	9 kg
4	Extinguishing material type	:	Powder

1.9 Fire fighting stations: Barracks area

1	Fire hoses	No.	No
2	Portable extinguishers	No.	1 each barack
3	Portable extinguisher Capacity	kg	6 kg
4	Extinguishing material type	:	Powder

1.10 Fire fighting stations: Emergency Accommodation Camp

1	Fire hoses	No.	
2	Portable extinguishers	No.	
3	Portable extinguisher Capacity	kg	
4	Extinguishing material type	:	

1.23 RIG SITE UTILITIES

.1 PORTABLE WATER PUMPS

1	Quantity	No	2
2	Make and type	:	Varisco J90
3	Driven by motor type	:	Diesel
4	Water Pump flow rate	lt/m	2000
4	Motor Power	HP	16
5	Their main use for	:	1

.2 WATER SUPPLYING LINE

1	O.D. diameter	in	1
2	Total length	m	Varisco J90

.3 CELLAR PUMP

1	Quantity	No	1
2	Make and type	:	Bellin or eq.
3	Cellar Pump flow rate	lt/m	1500
4	Driven by motor type	:	Electric, suitable for hazardous area.
5	Motor Power	HP	20

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.4 WASHING WATER SYSTEM		
1 Use Fresh water	yes/no	Yes
2 Use Reusable cleaned Water	yes/no	Yes
3 Has the system two separated water circuits	yes/no	Yes
4.1 Washing Water Hoses		
1 Quantity	No	3
2 With Self closing valve	:	Yes
3 Location	:	Shaker – Mud pits – Rig floor
.5. WELDING MACHINES		
1 Electric welding machines	No	1
2 Electric welding machines type	:	400 A
3 Torch oxygen-acetylene welding sets	No	1
.6 WATER BLAST CLEANING MACHINE		
1 Quantity	No	1
2 Make and type	:	H. pressure
.7 STEAM CLEANING MACHINE		
1 Quantity	No	1
2 Make and type	:	Sole Vesuvio
.8 WOODEN PANELS		
1 Wooden panel quantity	No	10
2 dimensions L-W-H	m-m-m	3x 1x 0,6

1.23.1 BARRACKS

.1 COMPANY OFFICE BARRACK		
1 Quantity	No	1
2 dimensions L-W-H	:	Company office/bedroom barrack 12 x 2.4 x 2.6 (m)
3 Complete with office furniture	:	Yes
4 Full Climate Control	yes/no	Yes
.1a BARRACK FOR SAFETY MEETING		On rental basis
1 Quantity	No	1
2 dimensions L-W-H	:	6 x 2.4 x 2.4
3 Complete with office furniture	:	Yes
4 Full Climate Control	yes/no	1
.3 CONTRACTOR OFFICE BARRACK		
1 Quantity	No	1
2 dimensions L-W-H	:	12 x 2.4 x 2.6 (m)
3 Complete with office furniture	:	Yes
4 Living Room	yes/no	Yes
5 Toilet and shower	yes/no	Only shower
6 Full Climate Control	yes/no	Yes
.4 MUD ENGINEER LABORATORY		
1 Quantity	No	Yes
2 dimensions L-W-H	:	

CONTRACTOR'S OFFER

3	Location	:	Yes
4	Complete with	:	No
5	Full Climate Control	yes/no	Yes
.5 DRESSING BARRACKS (for company use)			
1	Quantity	No	1 Dressing Barrack for Contractor use+1 Dressing Barrack (for contractor use + 10 company contractors)
2	dimensions L-W-H	:	12 x 2.4 x 2.6 (m)
3	Location	:	Yes
4	Complete with	:	No
5	Full Climate Control	yes/no	Yes
.6 WORKSHOP BARRACKS			
1	Quantity	:	3 (mechanic, electrician, welder)
2	dimensions L-W-H	:	6 x 2.4 x 2.6 (m)
.7 WAREHOUSE BARRACKS			
1	Quantity	:	3
2	dimensions L-W-H	:	6 x 2.4 x 2.6 (m)
.8 RECEPTION OFFICE			
1	Quantity	:	1 On rental basis
2	dimensions L-W-H	:	6 x 2.4 x 2.6 (m)
3	Full Climate Control	yes/no	Yes
4	Complete intercommunication system	yes/no	Yes

1.23.2 ACCOMMODATION CAMP

Not Necessary

1.23.3 WINTERIZATION SYSTEM

.1 WINTERIZATION SYSTEM		°C	Not Necessary	
1	Designed for an outside temperature of			
.2 RIG HEATER SOURCES			STANDARD EQUIPMENT	OPTIONAL EQUIPMENT
1	Air heaters quantity	No		
2	Air heaters	make		
3	Air heaters	type		
4	Air heaters thermal capacity	kcal/h		
5	Electrical heaters quantity	no		
6	Electrical heaters	make		
7	Electrical heaters	type		
8	Electrical heaters power	kw		
9	Location	:		
10	Location	:		
11	Location	:		
.3 ENCLOSED AREAS				
1	Rig Floor	yes/no		

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2 Rig substructure	yes/n o		
3 Mud tanks area	yes/n o		
4 Mud Pumps area	yes/n o		
5 Mud Mixing area	yes/n o		
6 Pipe Rack Area	yes/n o		
7 Choke manifold	yes/n o		
8 Others enclosed areas	:		
.4 HEATED AREAS			
1 Rig Floor	yes/n o		
2 Rig substructure	yes/n o		
3 Derrickman Platform	yes/n o		
4 Casing stabbing Board	yes/n o		
5 Mud tanks area	yes/n o		
6 Mud Pumps area	yes/n o		
7 Choke manifold	yes/n o		
8 Other Heated areas	:		

1.23.4 RIG INTERCOMMUNICATION SYSTEM

.1 FIXED INSTALLATION			
1 Make and type	:	Elettromeccanica MB	
2 Company Office Commun. Point	yes/ no	Yes	
3 Contractor Office Commun. Point	yes/ no	Yes	
4 Rig floor Communication Point	yes/ no	Yes	
5 SCR barrack Communication Point	yes/ no	Yes	
6 Mud Mixing Area Comm. Point	yes/ no	Yes	
7 Shale shaker area Comm. Point	yes/ no	Yes	
8 Mud Pump Area Commun. Point	yes/ no	Yes	
9 Mud logging unit	yes/ no	Yes	
10 Reception at the entrance of location	yes/ no	Yes	
11 Other Points	yes/ no	Yes	
12 Interphone rig-floor Derrick platform.	yes/ no	Not applicable	
13 Interphone rig-floor Substructure.	yes/ no	interphone rig-floor- dog house	
14 Public address system	yes/ no	Yes	
.2 PORTABLE RADIOS			
1 Quantity	no	5	
2 make and type	:	HT 920	
3 Suitable for hazardous area	:	Yes EEX IB iic T4	

1.24 HOIST & TRANSPORTATION MEANS

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10	Rig Mechanic	No	2		1
11	Mechanic Welder	No	* 1		* 0.5
12	Motor man	No	No		
13	Driver	No	No		
14	Crane operator/fork lift operator	No	2		1
15	Receptionist	No	Separate service **		
16	Others	No			
Total		:	35		

* Il saldatore segue una turnazione 15 in /13 out con sequenza regolare. Qualora in Committente necessitasse delle prestazioni del saldatore durante il turno di riposo, verrà riaddebitato il costo giornaliero come da tabella allegata unitamente al costo del viaggio.

** By third party at documented cost plus contractual mark up

2.3 CONTRACTOR'S PERSONNEL QUALIFICATION

		TENDERER'S COMMENT
1	<p>GENERAL</p> <p>TENDERER shall ensure that all personnel hold the necessary authorizations to operate in the Country, in accordance with local laws and regulations.</p> <p>TENDERER shall ensure that all personnel involved in the operation is fully trained and skilled before they are assigned to their respective tasks.</p> <p>TENDERER shall ensure that all the key personnel will be able to speak and write Italian and English language.</p> <p>TENDERER shall ensure that the personnel have full knowledge of the procedures and job instruction and that the tasks are performed as required and in accordance with the applicable RULES and REGULATIONS</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p>
2	<p>GENERAL REQUIREMENTS</p> <p>TENDERER shall qualify the following personnel in accordance to the minimum requirements listed below:</p> <ul style="list-style-type: none"> • RIG MANAGER • RIG SUPERINTENDENT • SAFETY SUPERVISOR • TOOL PUSHER / TOUR PUSHER • DRILLER • ASSISTANT DRILLER • DERRICKMAN • FLOORMAN 	<p>Yes</p>

TENDERER'S COMMENT

TOUR PUSHER
WORK EXPERIENCE:

TRAINING:

DRILLER
WORK EXPERIENCE

TRAINING:

ASSISTANT DRILLER
WORK EXPERIENCE:

TRAINING:

Sostiene ogni due anni corsi pratici e teorici di WELL CONTROL . Sostiene i corsi di H2S, antincendio e pronto soccorso presso enti terzi qualificati.

Esperienza adeguata alla mansione svolta

Possiede una notevole autonomia e capacità manageriale/organizzativa ed è in grado di coordinare nonché controllare tutti gli aspetti tecnici e amministrativi di ciascuna operazione che avviene in cantiere.

Sostiene ogni due anni corsi pratici e teorici di WELL CONTROL . Sostiene i corsi di H2S, antincendio e pronto soccorso presso enti terzi qualificati.

Esperienza adeguata alla mansione svolta

Ha la stessa preparazione tecnica dell' ASSISTANT DRILLER.
Ha una adeguata capacità manageriale/organizzativa.
Ha una adeguata conoscenza base di ogni componente l'impianto.

Sostiene ogni due anni corsi pratici e teorici di WELL CONTROL . Sostiene i corsi di H2S, antincendio e pronto soccorso presso enti terzi qualificati

Esperienza adeguata alla mansione svolta

Ha una adeguata conoscenza base di ogni componente l'impianto.

Sostiene ogni due anni corsi pratici e teorici di WELL CONTROL . Sostiene i corsi di H2S, antincendio e pronto soccorso presso enti terzi qualificati

	TENDERER'S COMMENT
<p>DERRICKMAN <u>WORK EXPERIENCE:</u></p> <p><u>TRAINING:</u></p>	<p>Esperienza adeguata alla mansione svolta</p> <p>Training on the job.</p> <p>Sostiene i corsi di H2S, antincendio e pronto soccorso presso enti terzi qualificati</p>
<p>FLOOR MAN <u>WORK EXPERIENCE:</u></p> <p><u>TRAINING:</u></p>	<p>Esperienza adeguata alla mansione svolta</p> <p>Training on the job.</p> <p>Sostiene i corsi di H2S, antincendio e pronto soccorso presso enti terzi qualificati se fa parte della squadra di emergenza</p>
<p>ELECTRICIAN <u>WORK EXPERIENCE</u></p> <p><u>TRAINING:</u></p>	<p>Esperienza adeguata alla mansione svolta</p> <p>Training on the job</p> <p>Corsi PES/PAV</p>
<p>RIG MECHANIC <u>WORK EXPERIENCE</u></p> <p><u>TRAINING</u></p>	<p>Esperienza adeguata alla mansione svolta</p> <p>Training on the job</p>
<p>4 TRAINING COURSES All training courses indicated above shall be performed by a specialized training centre. OPITO, EPT certifications are acceptable. Certifications delivered by other training centres are subject to Company's agreement and approval. Course certificates shall report the issuing and expiring date. Whenever expiring date would not be indicate, a maximum period of 3 years</p>	<p>Yes</p>

	TENDERER'S COMMENT
validity will be considered	
<p>H₂S Course shall be performed according to API RP 49 "Drilling and Well Servicing Operations Involving Hydrogen Sulphide". A practical training on breathing apparatus use shall be included</p>	Yes
<p>Fire Fighting Course will include basic training on risk assessment and will forecast some drills on the use of fire fighting equipment</p>	Yes
<p>First Aid Course will include basic training on first aid and rescue</p>	Yes
<p>Well Control For the position of Assistant Driller, Driller, Tour Pusher, Tool Pusher, Rig Superintendent, a specific training on well control is required The related certification shall be in accordance to IWCF or IADC Well Cap. This certification shall be renewed each two (2) years.</p>	Yes

Hydro Drilling s.p.A.

Impianto "Leonardo HH220" – Pozzo Sabbioncelo 53
Tresigallo (FE)

VALUTAZIONE IMPATTO RUMORE



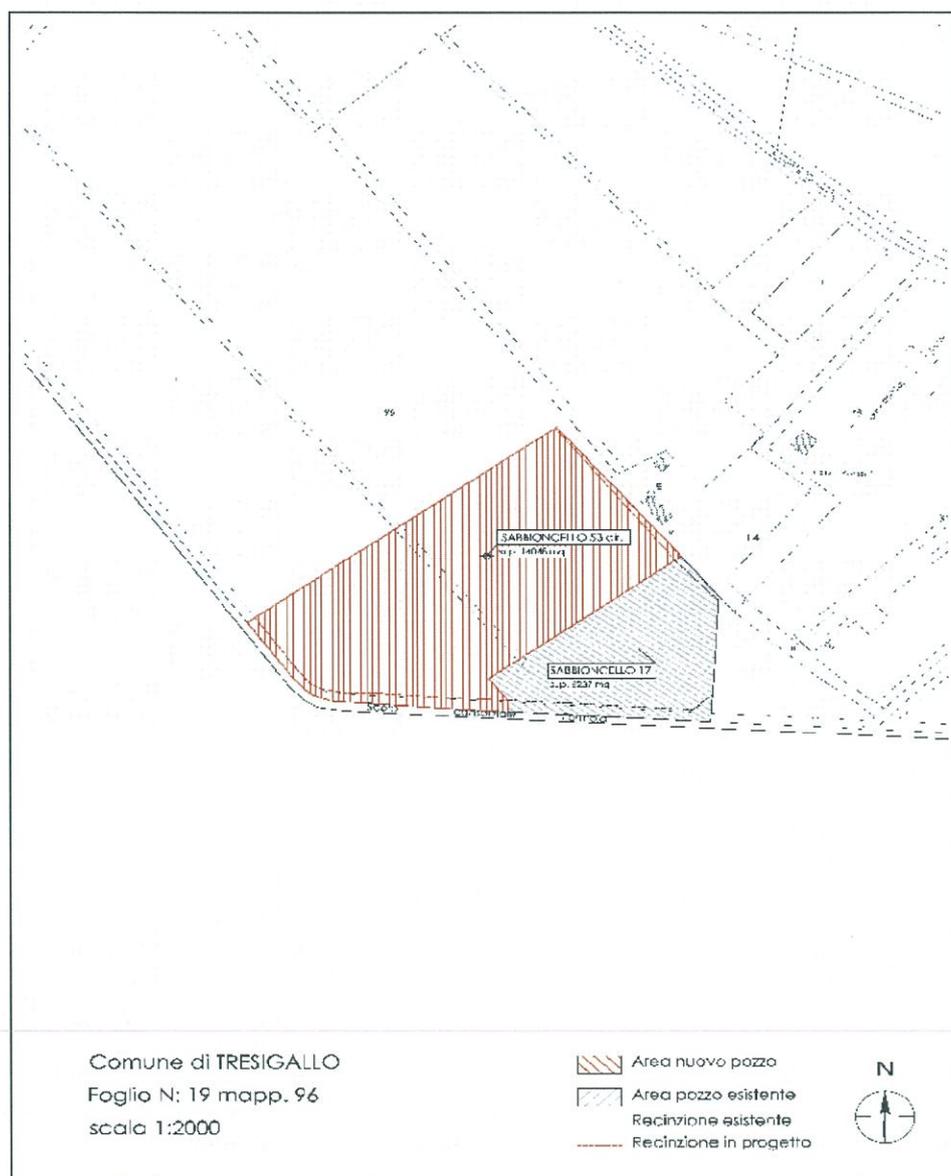
MEDICINA E SICUREZZA LAVORO
IGIENE INDUSTRIALE
AMBIENTE ACUSTICA
INGEGNERIA

Maggio 2012

PREMESSA

La Soc. Hydro Drilling International S.p.A. ci ha incaricato di effettuare una valutazione di impatto rumore, generato dall'attività di perforazione del pozzo "Sabbioncello 53", posto in comune di Tresigallo (FE); la perforazione verrà eseguita con l'impianto "Leonardo HH220".

Nella mappa seguente è riportato l'ubicazione del nuovo pozzo.



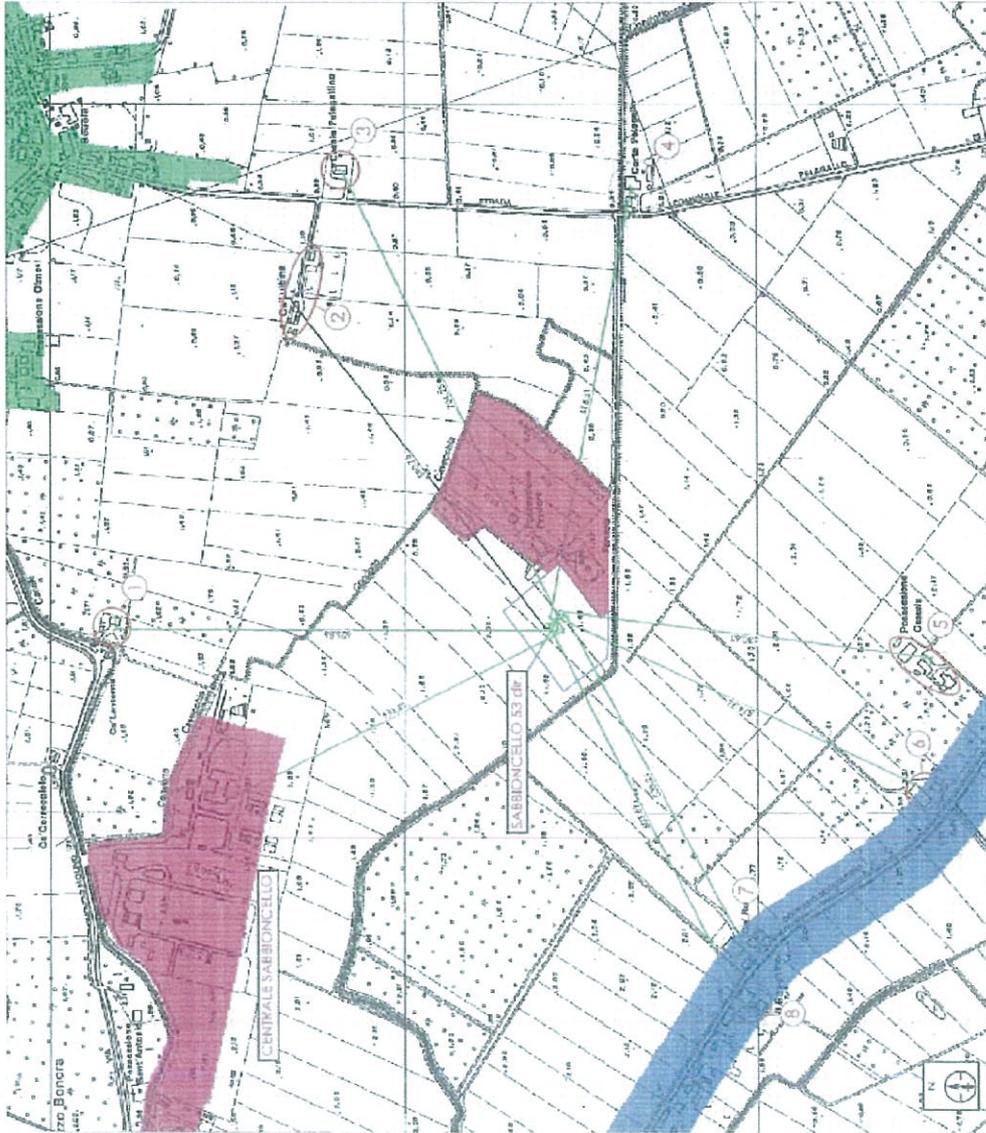
Il rumore emesso dall' impianto Leonardo HH220 è stato rilevato nell'ottobre del 2010 presso il pozzo "Sabbioncello 51", sito sempre in comune di Tresigallo (FE), in loc. Rero.

Poiché anche il nuovo pozzo "Sabbioncello 53" è ubicato in area agricola con clima acustico influenzato dal rumore generato dalle vicine infrastrutture viarie ed è caratterizzato dalla stessa orografia, utilizzeremo i rilievi fonometrici a suo tempo effettuati nell'area circostante.

L'attività viene svolta sia durante il tempo di riferimento diurno, che durante quello notturno.

Per rumore emesso si intende quello generato solo dalla sorgente in studio, mentre il rumore immesso è quello dovuto all'insieme di tutte le sorgenti presenti (fondo, impianto, traffico veicolare).

Scopo dello studio è quello di determinare il rumore presso i ricettori presenti nelle aree adiacenti il pozzo, come indicato nella tavola seguente; la tavola, messa a disposizione da Stogit S.p.A., riporta anche la classificazione acustica delle aree.



○ Corpiccettori

— Perimetro area cantiere

LEGENDA CORPICCETTORI	CLASSE
① ABITAZIONE CIVILE E DEPOSITO ATTEGGI AGRICOLI I	III
② CASCINA AGRICOLA A DEBITATA	III
③ ABITAZIONE CIVILE	III
④ ABITAZIONE CIVILE, CASCINA E DEPOSITO ATTEGGI AGRICOLI	III
⑤ ABITAZIONE CIVILE E DEPOSITO FERRE	III
⑥ ABITAZIONE CIVILE E DEPOSITO ALLEVAMENTO DI CAVALLI MONTA ALL'AMERICANA PER 25 CAVALLI ALLEVAMENTO E BOE PER CAVALLI	IV
⑦	IV
⑧ ABITAZIONE CIVILE E MAGAZZINO	IV

CLASSI DI COSTRUZIONE C/50	Viziati in lire casuali di limitazione lega in dB(A) durante l'orario	DEFINIZIONE
Il caso precedente con le porte insonorizzate	55 - 65	ABITAZIONE
III case di tipo misto	60 - 65	
IV case di tipo misto	65 - 70	
V case per l'abitazione industriale	70 - 80	

CO	50/201	BANDO PER CONDIRTTORE TECNICO	STAGIONI	STAGIONI	STAGIONI	STAGIONI
PRO	2014	DATA	PROIEZIONE / COORDINATE	SCALE	APPROVAZIONE	STAGIONI
STOGIT			POSTAZIONE SABBIONCELLO 53			
IDENTIFICAZIONE COSTRUZIONI LIMITROFE AL POZZO						
SEMPRE	STRUTTURALE	POSIZIONE	DESCRIZIONE	STAGIONI	STAGIONI	STAGIONI
1:5000	1:5000	1:5000	1:5000	1:5000	1:5000	1:5000

La strumentazione è conforme alla classe 1 EN 60651/94 e 60804/94 e dotata di certificati di taratura in corso di validità (Vedasi **Allegato n.1** i certificati dell'anno delle misurazioni); essa è stata calibrata prima e dopo la misura.

L'indagine fonometrica effettuata non ha messo in evidenza la presenza di componenti tonali ed impulsive.

I valori delle misure sono indicati nella tabella seguente.

	<i>Fase di manovra 09/10/2010</i>	<i>Fase di perforazione 24/10/2010</i>
PM1a (Ovest-Nord-Ovest – 100 m di distanza)		
<i>Ora rilevazione</i>	9-10 circa	9-10 circa
<i>Laeq (dBA)</i>	53,0	55,3
PM2a (Ovest-Nord-Ovest – 200 m di distanza)		
<i>Ora rilevazione</i>	9-10 circa	9-10 circa
<i>Laeq (dBA)</i>	58,0	49,6
PM3a (Ovest-Nord-Ovest – 300 m di distanza)		
<i>Ora rilevazione</i>	9-10 circa	9-10 circa
<i>Laeq (dBA)</i>	41,3	45,7
PM1b (Nord-Nord-Est – 100 m di distanza)		
<i>Ora rilevazione</i>	10-11 circa	10-11 circa
<i>Laeq (dBA)</i>	40,8	56,2
PM2b (Nord-Nord-Est – 200 m di distanza)		
<i>Ora rilevazione</i>	10-11 circa	10-11 circa
<i>Laeq (dBA)</i>	43,3	49,2
PM3b (Nord-Nord-Est – 300 m di distanza)		
<i>Ora rilevazione</i>	10-11 circa	10-11 circa
<i>Laeq (dBA)</i>	46,3	44,7

	Fase di manovra 09/10/2010	Fase di perforazione 24/10/2010
PM1c (Est-Sud-Est – 100 m di distanza)		
Ora rilevazione	11-12 circa	11-12 circa
Laeq (dBA)	40,8	53,0
PM2c (Est-Sud-Est – 200 m di distanza)		
Ora rilevazione	11-12 circa	11-12 circa
Laeq (dBA)	38,9	47,4
PM3c (Est-Sud-Est – 300 m di distanza)		
Ora rilevazione	11-12 circa	11-12 circa
Laeq (dBA)	36,1	41,3
PM1d (Sud-Sud-Ovest – 100 m di distanza)		
Ora rilevazione	8-9 circa	8-9 circa
Laeq (dBA)	59,4	57,0
PM2d (Sud-Sud-Ovest – 200 m di distanza)		
Ora rilevazione	8-9 circa	8-9 circa
Laeq (dBA)	52,1	50,0
PM3d (Sud-Sud-Ovest – 300 m di distanza)		
Ora rilevazione	8-9 circa	8-9 circa
Laeq (dBA)	51,4	47,7

I valori sopra riportati sono indicativi del rumore totale presente durante le misure, ovvero del rumore immesso, somma dei contributi acustici di tutto quanto presente, compreso il traffico veicolare incidente sulle strade vicine.

E' doveroso sottolineare che le posizioni di misura che meglio caratterizzano il rumore emesso dall'impianto, in quanto poco influenzate da altri fattori, sono quelle nelle direzioni contrassegnate con le lettere b (Nord-Nord-Est) e c (Est-Sud-Est). Nelle direzioni a e d il rumore misurato è stato influenzato in modo non trascurabile da fattori esterni (in particolare il traffico veicolare, composto anche da mezzi pesanti, incidente sulle strade che corrono in tali direzioni).

Per questo motivo, nella tabella seguente saranno riportati, per le misure effettuate, i valori degli indicatori di rumore L90; l'indicatore L90 fornisce il livello di rumore che viene superato nel 90% del tempo di misura, e come tale è quello che meglio si presta alla quantificazione del rumore emesso da una sorgente a funzionamento continuo come questo impianto, quando vi siano sorgenti di tipo discontinuo, come quelle stradali, ad influenzare i valori di Leq.

Utilizzando questo indicatore, il contributo acustico del traffico viene ignorato, pertanto si ritiene che i valori della tabella sottostante possano essere considerati descrittori del reale rumore emesso dall'impianto.

	Fase manovra 09/10/2010	Fase perforazione 24/10/2010
PM1a (Ovest-Nord-Ovest – 100 m di distanza)		
L90	40,1	44,6
PM2a (Ovest-Nord-Ovest – 200 m di distanza)		
L90	45,1	48,2
PM3a (Ovest-Nord-Ovest – 300 m di distanza)		
L90	37,7	43,9
PM1b (Nord-Nord-Est – 100 m di distanza)		
L90	38,1	54,4
PM2b (Nord-Nord-Est – 200 m di distanza)		
L90	38,8	47,4
PM3b (Nord-Nord-Est – 300 m di distanza)		
L90	37,9	42,6
PM1c (Est-Sud-Est – 100 m di distanza)		
L90	38,5	50,4
PM2c (Est-Sud-Est – 200 m di distanza)		
L90	35,8	45,3
PM3c (Est-Sud-Est – 300 m di distanza)		
L90	33,2	38,5
PM1d (Sud-Sud-Ovest – 100 m di distanza)		
L90	57,6	56,1
PM2d (Sud-Sud-Ovest – 200 m di distanza)		
L90	50,7	49,1
PM3d (Sud-Sud-Ovest – 300 m di distanza)		
L90	49,6	46,7

Nella tavola seguente sono indicati i punti di misura, trasferiti dal pozzo Sabbioncello 51 nella nuova ubicazione.



Utilizzando la legge della divergenza geometrica dell'onda sonora, verranno determinati i livelli di rumore presenti presso gli 8 ricettori indicati sulla planimetria di pagina 3.

Tale modo di agire è sicuramente cautelativo per i ricettori, in quanto non si tiene conto di altri fattori dissipativi del rumore aereo, quali :assorbimento dell'aria e del suolo, nonché presenza di schermi.

Nella tabella seguente sono riportati i livelli di rumore attesi sugli 8 ricettori, arrotondati a 0.5 dBA.

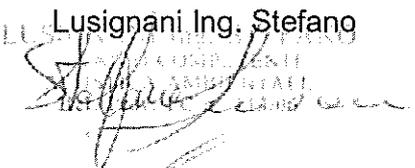
Ricettore		Distanza sorgente (m)	Abbattimento		L90 (dBA)	
			Rispetto punto misura	Divergenza geometrica (dBA)	Fase manovra	Fase perforaz.
1	Abitazione civile e deposito attrezzi	626	PM3b	6.1	32.0	36.5
2	C.na agricola disabitata	590	PM3b	6.0	32.0	36.5
3	Abitazione civile	704	PM3b	7.4	30.5	35.0
4	Abitazione civile, cascina	618	PM3c	6.1	27.0	32.5
5	Abitazione civile e deposito pere	530	PM3d	5.5	44.0	41.0
6	Abitazione civile e deposito	574	PM3d	6.0	43.5	40.5
7	Allevamento cavalli	538	PM3d	5.5	44.0	41.0
8	Abitazione civile e magazzino	623	PM3d	6.1	43.5	40.5

Conclusioni

La classificazione acustica dell'area oggetto di studio indica che tutti i ricettori ricadono in Classe III (area tipo misto) con limiti di emissione assoluta (rumore emesso solo dall'impianto) di 55 e 45 dBA rispettivamente per il tempo di riferimento diurno e notturno.

Dai dati sopra riportati ci si attende che anche il più restrittivo dei 2 limiti (notturno) venga rispettato in ogni ricettore.

Piacenza, 23.05.2012

Il Tecnico Competente
 Lusignani Ing. Stefano


ALL. 1

**CERTIFICATI UFFICIALI
DI TARATURA**



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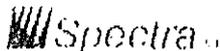
CENTRO DI TARATURA 163

Calibration Centre

Spectra Srl

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CERTIFICATO DI TARATURA N. 4040

Pagina 1 di 9

Page 1 of 9

Certificate of Calibration No. 4040

- Data di Emissione: 2009/01/26
date of Issue
destinatario LABOR Srl
addressee
Via Nino Bixio 2/4
Piacenza
- richiesta Off.12/09
application
- in data 2009/01/12
date
- Si riferisce a:
Referring to
- oggetto Ronometro
Item
- costruttore CESVA
manufacturer
- modello SC30
model
- matricola T221528
serial number
- data delle misure 2009/01/27
date of measurements
- registro di laboratorio 18/01
laboratory reference

Il presente certificato di taratura è emesso in base all'accreditamento SIT N. 163 rilasciato in accordo ai decreti attuativi della legge n. 273/1991 che ha istituito il Sistema Nazionale di Taratura (SNT). Il SIT garantisce le capacità di misura e le competenze metrologiche del Centro e la riferibilità delle tarature eseguite ai campioni nazionali ed internazionali delle unità del Sistema Internazionale delle Unità (SI).

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The measurement results reported in this Certificate were obtained following the procedures given in the following page, where the reference standards are indicated as well, from which starts the traceability chain of the laboratory, and the related calibration certificates in their course of validity. They relate only to the calibrated item and they are valid for the time and conditions of calibration, unless otherwise specified.

Le incertezze di misura dichiarate in questo documento sono state determinate conformemente al documento EA-4/02 e sono espresse come incertezza estesa ottenuta moltiplicando l'incertezza tipo per il fattore di copertura k corrispondente al livello di fiducia di circa il 95%. Normalmente tale fattore k vale 2.

The measurement uncertainties stated in this document have been determined according to EA-4/02. They were estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95%. Normally, this factor k is 2.

Il Responsabile del Centro
Head of the Center
Caglio Emilio

SIT

SERVIZIO DI TARATURA IN ITALIA

Calibration Service in Italy

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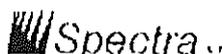
CENTRO DI TARATURA 163

Calibration Centre

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CERTIFICATO DI TARATURA N. 4041

Pagina 1 di 9

Certificate of Calibration No. 4041

Page 1 of 9

- Data di Emissione: 2009/01/27
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addressee
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- richiesta Off.12/09
application
- in data 2009/01/12
date

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Questo certificato non può essere riprodotto in modo parziale, salvo espressa autorizzazione scritta da parte del Centro.

- Si riferisce a:

Referring to
- oggetto Fonometro
Item
- costruttore CESVA
manufacturer
- modello SC30
model
- matricola T221531
serial number
- data delle misure 2009/01/27
date of measurements
- registro di laboratorio 18/01
laboratory reference

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The measurement uncertainties stated in this document have been determined according to EA-4/02. They were estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95%. Normally, this factor k is 2.

Il Responsabile del Centro
Head of the Center
Caglio Emilio

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SERVIZIO DI TARATURA IN ITALIA

Calibration Service in Italy

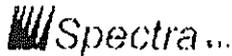
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CERTIFICATO DI TARATURA N. 4042

Certificate of Calibration No. 4042

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Page 1 of 9

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Piacenza
- richiesta Off.12/09
application
- in data 2009/01/12
date
- Si riferisce a:
Referring to
- oggetto Fonometro
Item
- costruttore CESYA
manufacturer
- modello SC30
model
- matricola T221540
serial number
- data delle misure 2009/01/27
date of measurements
- registro di laboratorio 18/01
laboratory reference

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The measurement results reported in this Certificate were obtained following the procedures given in the following page, where the reference standards are indicated as well, from which starts the traceability chain of the laboratory, and the related calibration certificates in their course of validity. They relate only to the calibrated item and they are valid for the time and conditions of calibration, unless otherwise specified.

Le incertezze di misura dichiarate in questo documento sono state determinate conformemente al documento EA-4/02 e sono espresse come incertezza estesa ottenuta moltiplicando l'incertezza tipo per il fattore di copertura k corrispondente al livello di fiducia di circa il 95%. Normalmente tale fattore k vale 2.

The measurement uncertainties stated in this document have been determined according to EA-4/02. They were estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95%. Normally, this factor k is 2.

Il Responsabile del Centro
Head of the Center
Gaglio Emilio



SERVIZIO DI TARATURA IN ITALIA

Calibration Service in Italy



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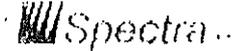
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CERTIFICATO DI TARATURA N. 4043

Certificate of Calibration No. 4043

Pagina 1 di 9

Page 1 of 9

- Data di Emissione: 2009/01/27

date of Issue

destinatario LABOR Srl

addressee

Via Nino Bixio 2/4

Piacenza

- richiesta Off.12/09

application

- in data 2009/01/12

date

Il presente certificato di taratura è emesso in base all'accreditamento SIT N. 163 rilasciato in accordo ai decreti attuativi della legge n. 273/1991 che ha istituito il Sistema Nazionale di Taratura (SNT). Il SIT garantisce le capacità di misura e le competenze metrologiche del Centro e la riferibilità delle tarature eseguite ai campioni nazionali ed internazionali delle unità del Sistema Internazionale delle Unità (SI).

Questo certificato non può essere riprodotto in modo parziale, salvo espressa autorizzazione scritta da parte del Centro.

- Si riferisce a:

Referring to

- oggetto Fonometro

Item

- costruttore CESVA

manufacturer

- modello SC30

model

- matricola T217948

serial number

- data delle misure 2009/01/27

date of measurements

- registro di laboratorio 18/01

laboratory reference

This certificate of calibration is issued in compliance with the accreditation SIT No. 163 granted according to decrees connected with Italian Law No. 273/1991 which has established the National Calibration System. SIT attests the measurement capability and metrological competence of the Centre and the traceability of calibration results to the national and international standards of the International System of Units (SI).

This certificate may not be partially reproduced, except with the prior written permission of the issuing Centre.

I risultati di misura riportati nel presente Certificato sono stati ottenuti applicando le procedure citate alla pagina seguente, dove sono specificati anche i campioni di prima linea da cui inizia la catena di riferibilità del Centro ed i rispettivi certificati di taratura, in corso di validità. Essi si riferiscono esclusivamente all'oggetto in taratura e sono validi nel momento e nelle condizioni di taratura, salvo diversamente specificato.

The measurement results reported in this Certificate were obtained following the procedures given in the following page, where the reference standards are indicated as well, from which starts the traceability chain of the laboratory, and the related calibration certificates in their course of validity. They relate only to the calibrated item and they are valid for the time and conditions of calibration, unless otherwise specified.

Le incertezze di misura dichiarate in questo documento sono state determinate conformemente al documento EA-4/02 e sono espresse come incertezza estesa ottenuta moltiplicando l'incertezza tipo per il fattore di copertura k corrispondente al livello di fiducia di circa il 95%. Normalmente tale fattore k vale 2.

The measurement uncertainties stated in this document have been determined according to EA-4/02. They were estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95%. Normally, this factor k is 2.

Il Responsabile del Centro
Head of the Center
Caglio Emilio

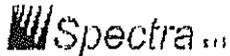
CENTRO DI TARATURA 163

Calibration Centre

Spectra Srl
Laboratorio Certificazioni

Tel.: 039 613321

Fax: 039 6133235

Via Belvedere, 42
Arcore (MI) - Italia

spectra@spectra.it

www.Spectra.it

CERTIFICATO DI TARATURA N. 3073

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Certificate of Calibration No. 3073

- Data di Emissione: 2008/01/17
date of Issue

destinatario LABOR Srl
addressee

Via Nino Bixio 2/4
Piacenza

- richiesta Off.15/08
application

- in data 2008/01/09
date

- Si riferisce a:
Referring to

- oggetto Calibratore
Item

- costruttore QUEST
manufacturer

- modello QC-20
model

- matricola QF6080045
serial number

- data delle misure 2008/01/17
date of measurements

- registro di laboratorio 18/08
laboratory reference

Il presente certificato di taratura è emesso in base all'accreditamento SIT N. 163 rilasciato in accordo ai decreti attuativi della legge n. 273/1991 che ha istituito il Sistema Nazionale di Taratura (SNT). Il SIT garantisce le capacità di misura e le competenze metrologiche del Centro e la riferibilità delle tarature eseguite ai campioni nazionali ed internazionali delle unità del Sistema Internazionale delle Unità (SI).

Questo certificato non può essere riprodotto in modo parziale, salvo espressa autorizzazione scritta da parte del Centro.

This certificate of calibration is issued in compliance with the accreditation SIT No. 163 granted according to decrees connected with Italian Law No. 273/1991 which has established the National Calibration System. SIT attests the measurement capability and metrological competence of the Centre and the traceability of calibration results to the national and international standards of the International System of Units (SI).

This certificate may not be partially reproduced, except with the prior written permission of the issuing Centre.

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The measurement results reported in this Certificate were obtained following the procedures given in the following page, where the reference standards are indicated as well, from which starts the traceability chain of the laboratory, and the related calibration certificates in their course of validity. They relate only to the calibrated item and they are valid for the time and conditions of calibration, unless otherwise specified.

Le incertezze di misura dichiarate in questo documento sono state determinate conformemente al documento EA-4/02 e sono espresse come incertezza estesa ottenuta moltiplicando l'incertezza tipo per il fattore di copertura k corrispondente al livello di fiducia di circa il 95%. Normalmente tale fattore k vale 2.

The measurement uncertainties stated in this document have been determined according to EA-4/02. They were estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95%. Normally, this factor k is 2.

Il Responsabile del Centro
Head of the Center
Caglio Emilio



Piacenza, 30 Maggio 2013

Spett.le
HYDRO DRILLING INTERNATIONAL S.p.A.
Piazza Garibaldi, 31
15121 ALESSANDRIA (AL)

Il giorno 16 maggio 2013, presso il vostro impianto **"ARCHIMEDE HH220"** operativo in località Lido di Spina (RA) , abbiamo effettuato il campionamento alle emissioni in atmosfera dei 3 gruppi elettrogeni principali e del gruppo elettrogeno d'emergenza.

Per effettuare i suddetti controlli è stato necessario aggiungere al termine della marmitta di scarico di ogni generatore una prolunga della lunghezza di 4 metri dotata di presa di campionamento, secondo la norma UNI 10169.

Di seguito elenchiamo gli strumenti utilizzati:

• **Per la determinazione di portata , temperatura e % H₂O :**

- 1) Elaboratore ZAMBELLI Mod. 5006 DL da 0 a 100 mm H₂O
- 2) Darcy da 1 m (K 0,734)
- 3) Campionatori MEGASYSTEM Mod. LIFE XP 0,3 ÷ 7 l/min
- 4) Torri di gel di silice da 250 cc per acqua.

• **Per il campionamento polveri :**

- 1) Tubi acciaio inox, porta membrane inox, ugelli inox, membrane estere di cellulosa
- 2) Campionatori portatili MEGASYSTEM Mod. LIFETEK da 0,5 ÷ 50 l/min
- 3) Torri di gel di silice da 250 cc per protezione campionatori.



- **Per il campionamento CO, CO₂:**

- 1) Analizzatore Horiba PG - 350
- 2) Analizzatori continuo SIEMENS Mod. ULTRAMAT 23
(Campi di misura CO: I° Campo 0-150 ppm II° Campo 0-750 ppm)
(Campi di misura CO₂: I° Campo 0-5% II° Campo 0-10%)

- **Per il campionamento O₂:**

- 1) Analizzatori EUROTRON Mod. GREEN LINE MK2
- 2) Analizzatore Horiba PG - 350

- **Per il campionamento NO₂:**

- 1) Campionatori MEGASYSTEM Mod. LIFE XP 0,3 ÷ 7 l/min + trappole per condensa
- 2) Sonda portatile riscaldata ANALITICA STRUMENTI Mod. STAC2000/gas
- 3) Dispositivo di raffreddamento Peltier con gorgogliatori in vetro di tipo A
(ANALITICA STRUMENTI)
- 4) Analizzatore Horiba PG - 350

Metodi analitici e conclusioni

Nei certificati sono indicati i metodi analitici utilizzati.

Le emissioni misurate si confrontano con:

Decreto Legislativo 3 aprile 2006 n°152

Distinti saluti.





Piacenza, 30/05/2013 Certificato n° **LAB13/0365**
 Ditta: **HYDRO DRILLING INTERNATIONAL S.p.A.**
 Sede legale: **Piazza Garibaldi, 31 - ALESSANDRIA (AL)**
 Cantiere di: **LIDO DI SPINA (RA)** Impianto: **ARCHIMEDE HH220**
 Punto di prelievo: **GRUPPO ELETTROGENO N°1**

Data campionamento: 16/05/2013 ora: 13,30 -15,30
 Temp. media ambiente (°K): 289 Patm (Pa): 100000

Dimensioni camino (m):
 diametro Ø = 0,37 Sez. camino (m²): 0,108

Andamento livello emissione: **Costante/continuo** Dist. Ultima curva: **2 metri**

Produzione in atto: **motore al 60%**

N° assi di misura: 1 N° misure: 6 (Pa)

1	2	3	4	5	6	7	8	9	10
308	304	299	245	270	283				

PST (Pa): 100060 rho (Kg/m³): 0,65 O₂ = 14,6% V media (m/s): 25,0

Peso mol. (anidro): 29,34 H₂O v/v: 3,2% CO₂ = 4,7%

Temperatura fumi al prelievo (°K): 534 ± 1 UNI 10169

Portata fumi umidi (Nm³/h): 4955 ± 5% UNI 10169

Portata fumi secchi (Nm³/h): 4795 ± 5% UNI 10169

Inquinanti emessi: O ₂ rif. 5%	Conc. mg/Nm ³	Incertezza Unich.M158	Flusso m. g/h	Metodo	m ³ camp.
Materiale particellare - 1° Camp.	112,1	± 27,7	215,0	UNI EN 13284-1	0,569
Materiale particellare - 2° Camp.	114,3	± 28,2	219,2	UNI EN 13284-1	0,569
Materiale particellare - 3° Camp.	108,8	± 26,9	208,7	UNI EN 13284-1	0,570
Media Materiale particellare	111,7	± 27,6	214,3		1,707
Monossido di Carbonio (CO) - 1° Camp.	471,9	± 38,8	905,0	UNI EN 15058	/
Monossido di Carbonio (CO) - 2° Camp.	459,4	± 37,8	881,1	UNI EN 15058	
Monossido di Carbonio (CO) - 3° Camp.	462,5	± 38,0	887,1	UNI EN 15058	
Media CO	464,6	± 38,2	891,1		
Ossidi di Azoto (NO ₂) - 1° Camp.	2557,4	± 631,0	4904,9	D.M. 25 AGOSTO '00 ALL.1	0,018
Ossidi di Azoto (NO ₂) - 2° Camp.	2562,5	± 632,3	4914,8	D.M. 25 AGOSTO '00 ALL.1	0,018
Ossidi di Azoto (NO ₂) - 3° Camp.	2567,6	± 633,6	4924,6	D.M. 25 AGOSTO '00 ALL.1	0,018
Media NO₂	2562,5	± 632,3	4914,8		0,054

Nota: Per il campionamento isocinetico è stata utilizzata una prolunga accoppiata allo scarico

Confronto: Decreto Lgs. 3 aprile 2006 n°152	
Limiti: Materiale Particellare	130 mg/Nm³
Monossido di carbonio (CO)	650 mg/Nm³
Ossidi di azoto (NO₂)	4000 mg/Nm³

Conclusioni: **I limiti in emissione sono rispettati**

Accesso: **con scala portatile a norma secondo D.lgs 81/08**



LABOR s.r.l.
Via N.Bixio, 2/4 PC



Labor s.r.l. Certificata UNI EN 9001:2008 da CSI CERT Certif. N° SQ113406



Piacenza, 30/05/2013 Certificato n° **LAB13/0366**
 Ditta: **HYDRO DRILLING INTERNATIONAL S.p.A.**
 Sede legale: **Piazza Garibaldi, 31 - ALESSANDRIA (AL)**
 Cantiere di: **LIDO DI SPINA (RA)** Impianto: **ARCHIMEDE HH220**
 Punto di prelievo: **GRUPPO ELETTROGENO N°2**

Data campionamento: 16/05/2013 ora: 13,30 -15,30
 Temp. media ambiente (°K): 289 Patm (Pa): 100000

Dimensioni camino (m):
 diametro Ø = 0,37 Sez. camino (m²): 0,108

Andamento livello emissione: Costante/continuo Dist. Ultima curva: 2 metri

Produzione in atto: motore al 65%

N° assi di misura: 1 N° misure: 6 (Pa)

1	2	3	4	5	6	7	8	9	10
154	152	150	123	135	142				

PST (Pa): 100053 rho (Kg/m³): 0,85 O₂ = 17,0% V media (m/s): 15,5

Peso mol. (anidro): 29,18 H₂O v/v: 3,4% CO₂ = 3,1%

Temperatura fumi al prelievo (°K): 406 ± 1 UNI 10169

Portata fumi umidi (Nm³/h): 4033 ± 5% UNI 10169

Portata fumi secchi (Nm³/h): 3895 ± 5% UNI 10169

Inquinanti emessi: O ₂ rif. 5%	Conc. mg/Nm ³	Incertezza Unich.M158	Flusso m. g/h	Metodo	m ³ camp.
Materiale particolare - 1° Camp.	90,6	± 22,4	88,2	UNI EN 13284-1	0,574
Materiale particolare - 2° Camp.	101,3	± 25,0	98,7	UNI EN 13284-1	0,553
Materiale particolare - 3° Camp.	90,5	± 22,3	88,1	UNI EN 13284-1	0,575
Media Materiale particolare	94,1	± 23,2	91,7		1,701
Monossido di Carbonio (CO) - 1° Camp.	580,0	± 47,7	564,8	UNI EN 15058	
Monossido di Carbonio (CO) - 2° Camp.	600,0	± 49,4	584,3	UNI EN 15058	
Monossido di Carbonio (CO) - 3° Camp.	575,0	± 47,3	559,9	UNI EN 15058	
Media CO	585,0	± 48,1	569,6		
Ossidi di Azoto (NO ₂) - 1° Camp.	2804,4	± 692,0	2730,8	D.M. 25 AGOSTO '00 ALL.1	0,018
Ossidi di Azoto (NO ₂) - 2° Camp.	2870,0	± 708,2	2794,7	D.M. 25 AGOSTO '00 ALL.1	0,018
Ossidi di Azoto (NO ₂) - 3° Camp.	2730,6	± 673,8	2658,9	D.M. 25 AGOSTO '00 ALL.1	0,018
Media NO₂	2801,7	± 691,3	2728,1		0,055

Nota: Per il campionamento isocinetico è stata utilizzata una prolunga accoppiata allo scarico

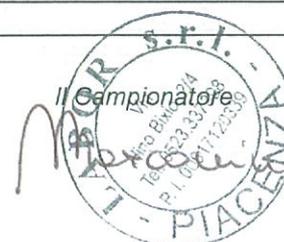
Confronto: Decreto Lgs. 3 aprile 2006 n°152	
Limiti: Materiale Particolare	130 mg/Nm3
Monossido di carbonio (CO)	650 mg/Nm3
Ossidi di azoto (NO2)	4000 mg/Nm3

Conclusioni: **I limiti in emissione sono rispettati**

Accesso con scala portatile a norma secondo D.lgs 81/08



LABOR s.r.l.
Via N.Bixio, 2/4 PC





Piacenza, 30/05/2013 Certificato n° **LAB13/0367**
 Ditta: **HYDRO DRILLING INTERNATIONAL S.p.A.**
 Sede legale: **Piazza Garibaldi, 31 - ALESSANDRIA (AL)**
 Cantiere di: **LIDO DI SPINA (RA)** Impianto: **ARCHIMEDE HH220**
 Punto di prelievo: **GRUPPO ELETTROGENO N°3**

Data campionamento: 16/05/2013 ora: 15,30 -17,30
 Temp. media ambiente (°K): 291 Patm (Pa): 100000

Dimensioni camino (m):
 diametro Ø = 0,37 Sez. camino (m²): 0,108

Andamento livello emissione: **Costante/continuo** Dist. Ultima curva: **2 metri**

Produzione in atto: **motore al 65%**

N° assi di misura: 1 N° misure: 6 (Pa)

1	2	3	4	5	6	7	8	9	10
160	158	156	128	141	147				

PST (Pa): 99940 rho (Kg/m³): 0,80 O₂ = 16,9% V media (m/s): 16,3

Peso mol. (anidro): 29,17 H₂O v/v: 3,6% CO₂: 3,1%

Temperatura fumi al prelievo (°K): 430 ± 1 UNI 10169

Portata fumi umidi (Nm³/h): 3999 ± 5% UNI 10169

Portata fumi secchi (Nm³/h): 3855 ± 5% UNI 10169

Inquinanti emessi: O ₂ rif. 5%	Conc. mg/Nm ³	Incertezza Unich.M158	Flusso m. g/h	Metodo	m ³ camp.
Materiale particolare - 1° Camp.	96,4	± 23,8	95,2	UNI EN 13284-1	0,567
Materiale particolare - 2° Camp.	93,1	± 23,0	92,0	UNI EN 13284-1	0,566
Materiale particolare - 3° Camp.	89,1	± 22,0	88,0	UNI EN 13284-1	0,570
Media Materiale particolare	92,9	± 22,9	91,7		1,702
Monossido di Carbonio (CO) - 1° Camp.	482,9	± 39,7	477,0	UNI EN 15058	/
Monossido di Carbonio (CO) - 2° Camp.	487,8	± 40,1	481,8	UNI EN 15058	
Monossido di Carbonio (CO) - 3° Camp.	497,6	± 40,9	491,5	UNI EN 15058	
Media CO	489,4	± 40,3	483,4		
Ossidi di Azoto (NO ₂) - 1° Camp.	2664,0	± 657,3	2631,3	D.M. 25 AGOSTO '00 ALL.1	0,018
Ossidi di Azoto (NO ₂) - 2° Camp.	2728,0	± 673,1	2694,5	D.M. 25 AGOSTO '00 ALL.1	0,018
Ossidi di Azoto (NO ₂) - 3° Camp.	2688,0	± 663,3	2655,0	D.M. 25 AGOSTO '00 ALL.1	0,018
Media NO₂	2693,3	± 664,6	2660,3		0,054

Nota: Per il campionamento isocinetico è stata utilizzata una prolunga accoppiata allo scarico

Confronto: Decreto Lgs. 3 aprile 2006 n°152	
Limiti: Materiale Particellare	130 mg/Nm3
Monossido di carbonio (CO)	650 mg/Nm3
Ossidi di azoto (NO2)	4000 mg/Nm3

Conclusioni: **I limiti in emissione sono rispettati**

Accesso: **con scala portatile a norma secondo D.lgs 81/08**



LABOR s.r.l.
Via N.Bixio, 2/4 PC



Labor s.r.l. Certificata UNI EN 9001:2008 da CSI CERT Certif. N° SQ113406



Piacenza, 30/05/2013 Certificato n° **LAB13/0368**

Ditta: **HYDRO DRILLING INTERNATIONAL S.p.A.**

Sede legale: **Piazza Garibaldi, 31 - ALESSANDRIA (AL)**

Cantiere di: **LIDO DI SPINA (RA)** Impianto: **ARCHIMEDE HH220**

Punto di prelievo: **GRUPPO ELETTROGENO D'EMERGENZA**

Data campionamento: 16/05/2013 ora: 15,30 -17,30

Temp. media ambiente (°K): 291 Patm (Pa): 100000

Dimensioni camino (m):
diametro Ø = 0,22 Sez. camino (m²): 0,038

Andamento livello emissione: Costante/continuo Dist. Ultima curva: 2 metri

Produzione in atto: motore al 50%

N° assi di misura: 1 N° misure: 6 (Pa)

1	2	3	4	5	6	7	8	9	10
1198	1182	1165	955	1052	1101				

PST (Pa): 100010 rho (Kg/m³): 0,86 O₂ = 10,5% V media (m/s): 43,1

Peso mol. (anidro): 28,92 H₂O v/v: 2,1% CO₂ = 3,1%

Temperatura fumi al prelievo (°K): 403 ± 1 UNI 10169

Portata fumi umidi (Nm³/h): 3999 ± 5% UNI 10169

Portata fumi secchi (Nm³/h): 3915 ± 5% UNI 10169

Inquinanti emessi: O ₂ rif. 5%	Conc. mg/Nm ³	Incertezza Unich.M158	Flusso m. g/h	Metodo	m ³ camp.
Materiale particolare - 1° Camp.	67,2	± 16,6	172,7	UNI EN 13284-1	0,567
Materiale particolare - 2° Camp.	70,0	± 17,3	179,9	UNI EN 13284-1	0,566
Materiale particolare - 3° Camp.	72,2	± 17,8	185,6	UNI EN 13284-1	0,570
Media Materiale particolare	69,8	± 17,2	179,4		1,702
Monossido di Carbonio (CO) - 1° Camp.	382,9	± 31,5	983,7	UNI EN 15058	/
Monossido di Carbonio (CO) - 2° Camp.	386,7	± 31,8	993,5	UNI EN 15058	
Monossido di Carbonio (CO) - 3° Camp.	392,4	± 32,3	1008,2	UNI EN 15058	
Media CO	387,3	± 31,9	995,2		
Ossidi di Azoto (NO ₂) - 1° Camp.	843,4	± 208,1	2167,2	D.M. 25 AGOSTO '00 ALL.1	0,018
Ossidi di Azoto (NO ₂) - 2° Camp.	837,2	± 206,6	2151,1	D.M. 25 AGOSTO '00 ALL.1	0,018
Ossidi di Azoto (NO ₂) - 3° Camp.	855,9	± 211,2	2199,3	D.M. 25 AGOSTO '00 ALL.1	0,018
Media NO₂	845,5	± 208,6	2172,5		0,054

Nota: Per il campionamento isocinetico è stata utilizzata una prolunga accoppiata allo scarico

Confronto: **Decreto Lgs. 3 aprile 2006 n°152**

Limiti: Materiale Particolare	130 mg/Nm³
Monossido di carbonio (CO)	650 mg/Nm³
Ossidi di azoto (NO₂)	4000 mg/Nm³

Conclusioni: **I limiti in emissione sono rispettati**

Accesso con scala portatile a norma secondo D.lgs 81/08



LABOR s.r.l.
Via N.Bixio, 2/4 PC

