



# GDS

German Dredger Services GmbH

GERMAN DESIGN AND EUROPEAN FINAL PROCESSING



## AMPHIBIOUS EXCAVATOR GDS SE 220

# AMPHIBIOUS EXCAVATOR

## GDS SE 220



**GDS specializes in R&D, manufacturing, sales and related services of engineering equipment and parts, especially excavators and amphibious excavators. Meanwhile GDS is more devoted to innovation of technology and improvement of quality. For amphibious excavators, GDS carries out two series: marsh and floating amphibious excavators according to different working conditions.**

**FULL SERVICE  
PACKAGE AND  
INTERNATIONAL  
STANDARDS**

From construction support to plant consulting, project planning, service and maintenance including spare parts business we are able to offer a complete package from a single source. We engineer and supply backhoe dredgers as well as amphibious excavators with backup service worldwide based on customer requirements and latest international standards.

There are five models of amphibious excavators: SE75, SE135, SE220, SE245 and SE335. Furthermore, GDS can provide customized pontoons and working attachment with comprehensive solutions according to different working conditions, for example: amphibious excavators with over length arm, amphibious excavators with hydraulic extendable pontoons, amphibious excavators with strengthened tracks especially for saline and alkaline land, amphibious excavators with side pontoons and spuds providing additional stability and enhanced operability on water around 6 meters deep, optional working attachments like grippers and hydraulic breakers.

# AMPHIBIOUS EXCAVATOR

## GDS SE 220



With strong technology, advanced equipment, comprehensive testing methods, reliable quality, the products are widely used in

- dredging and landscaping
- swamp and wetland construction
- maintenance and cleaning of waterways, lakes, shorelines and ponds
- deepening of waterways and river deltas
- flood protection and flood maintenance works
- maintenance and repair of natural environment
- pipeline laying project
- erosion control and prevention

Our products are not only popular with domestic customers but also overseas such as Europe, Africa and Southeast Asia.



### MAIN FEATURES OF GDS AMPHIBIOUS EXCAVATOR:

- Powerful Cummins engine ensures high working efficiency.
- Reliable KAWASAKI hydraulic system is efficient, energy-saving and excellent performance.
- Special & advanced design of pontoon with big buoyancy to work stably in shallow water.

## A TRULY MULTIPURPOSE MACHINE

All amphibious excavators and parts comply with applicable emission norms and have been constructed in accordance with the machine guidelines (2006/42/EC).



**The extremely low ground pressure of the amphibious machine will neither cause any permanent damage to the wetlands nor the native aquatic plants.**

The amphibious excavator can be used to clean up, repair, and restore wetlands. It has been proven numerous times to be an indispensable machine in this respect. A truly multipurpose machine that provides an attractive ROI (Return On Investment) for our customers.

**The amphibious excavator is designed to trek on soft and swampy terrains, and on shallow water too.**

The high and wide pontoon undercarriage can easily overcome the varying water depths in different sections of the river. The pontoon also has sufficient floating capacity to support the entire machine mass as a safety design feature. Low ground pressure is the hallmark of the pontoon undercarriage, it permits the machine to move unconstrained in this difficult ground condition where standard crawler excavators would not be able to work.



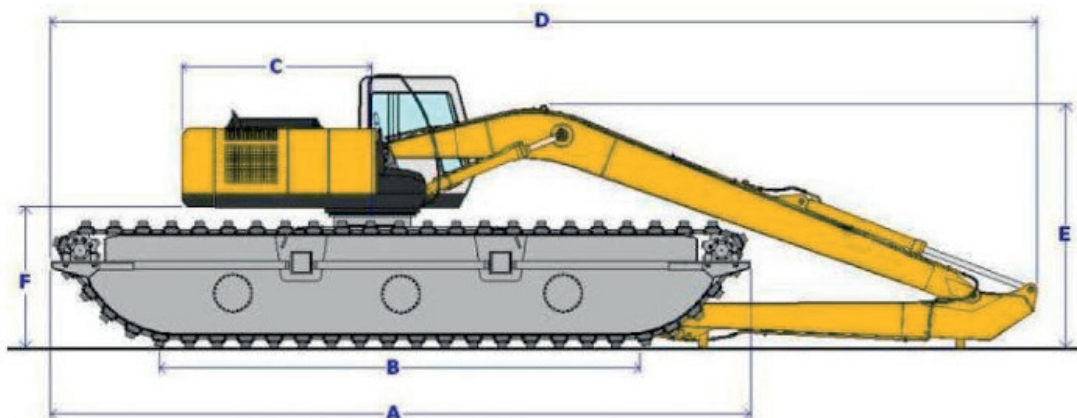
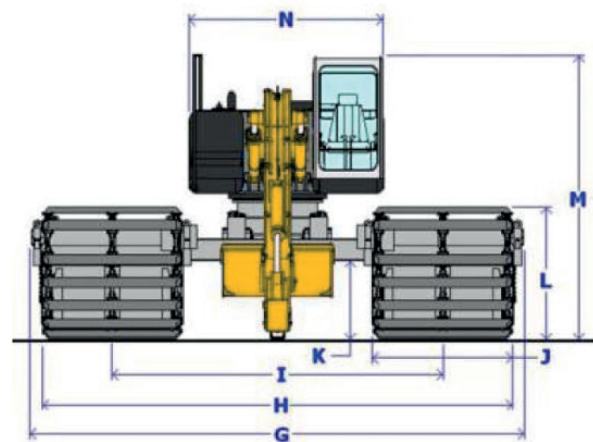
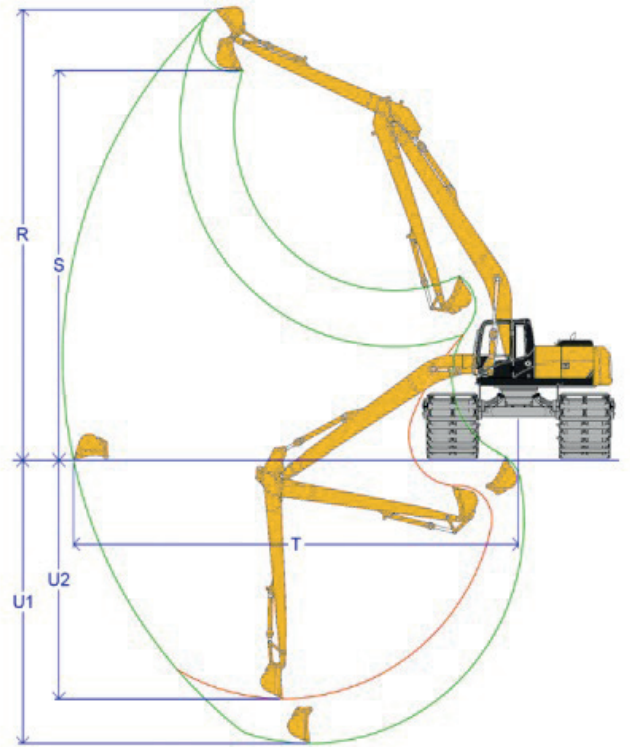
The main task of the amphibious machine is to dredge the riverbed to the desired depth. Unknown to many, these machines are working on an active channel where the water level can vary from 2 to 10 feet, or more at times.



# AMPHIBIOUS EXCAVATOR GDS SE 220

## TECHNICAL SPECIFICATION

DIM (m)	Description	SE220 For 20-23 ton class
<b>A</b>	Max. Track Length	<b>9.71</b>
<b>B</b>	Track Length on Ground	<b>4.30</b>
<b>C</b>	Rear Upper Structure Length	<b>2.85</b>
<b>D</b>	Overall Length	<b>13.63</b>
<b>E</b>	Height of Boom	<b>3.43</b>
<b>F</b>	Counterweight Clearance	<b>2.17</b>
<b>G</b>	Overall Width (outwardly extendable)	<b>6.09</b>
<b>H</b>	Undercarriage width	<b>5.96</b>
<b>I</b>	Track Gauge	<b>4.18</b>
<b>J</b>	Track Cleat Width	<b>1.78</b>
<b>K</b>	Min. Ground Clearance	<b>1.52</b>
<b>L</b>	Track Height	<b>1.91</b>
<b>M</b>	Overall Cab Height	<b>4.05</b>
<b>N</b>	Upper Structure Overall Width	<b>2.73</b>
<b>R</b>	Max. Cutting Height	<b>15.50</b>
<b>S</b>	Max. Loading Height	<b>12.37</b>
<b>T</b>	Recommended Outreach	<b>14.45</b>
<b>U1</b>	Max. Digging Depth from Front	<b>11.50</b>
<b>U2</b>	Max. Digging Depth from Side	<b>8.00</b>
	Bucket Capacity (m3)	<b>0.80</b>



## ENGINE PERFORMANCE DATA 1/5

**We, GDS German Dredger Services GmbH as a manufacturer of amphibious excavators hereby confirm the following specification of our amphibious excavator GDS SE 220.**

The entire amphibious excavator GDS SE 220 and especially the assemblies motor, the cooling system, hydraulic system, pumps and gears, mechanical assemblies and the entire electrical system are suitable for work in tropical areas up to a temperature of at least +55 °C.

**Performance Data of main diesel engine type QSB 7** – based on operating with fuel system, water pump, lubricating oil pump, air cleaner, alternator, hydraulic systems, etc. is based on operation at SAE standard J816b condition of 500 feet (150m) altitude (29.00 in [736mm] Hg dry barometer), 85 °F (29°C) intake air temperature and 0.38 in. (9.6m) Hg water vapor pressure, using No 2 diesel or a fuel corresponding to ASTM D2:

Altitude above which output should be limited - **300 ft. (90 m)**

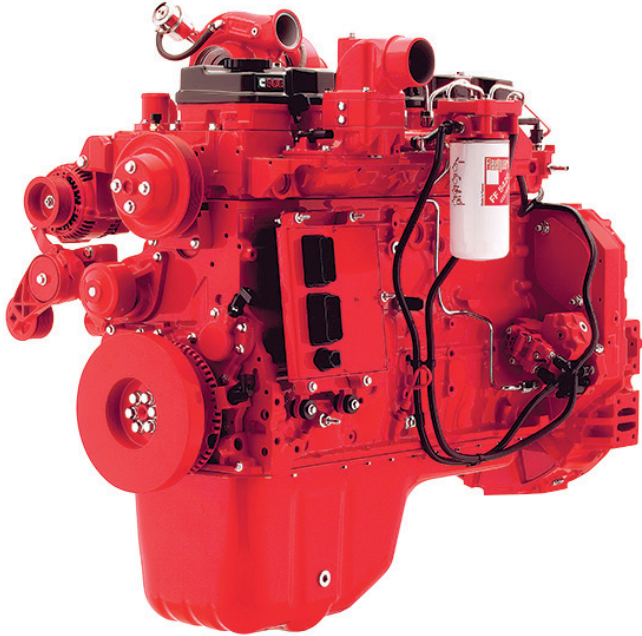
Correction factor per 1000 ft.(300m) above altitude limit **3%**

Temperature above which output should be limited **77 °F (25 °C)**

Correction factor per 10°F(11°C) above temperature limit **1%(2%)**



ENGINE PERFORMANCE DATA 2/5



**Industrial QSB6.7 FR95058**

150 kW (201 hp) @ 2050 RPM  
 825 N-m (608 lb-ft) @ 110 RPM

Compression Ratio: 17.3:1	Displacement: 6.7 L (408 in3)
Fuel System: Bosch	Aspiration: Turbocharged CAC

Emission Certification  
 EU Stage 3A  
 Intermittent  
 Rating Types

All data is based upon operation with fuel system, water pump, and the following conditions:

Intake:	2.45 kPa (9.85 in H <sub>2</sub> O) inlet air restriction, 100 mm (3.94 in) inner diameter pipe
Exhaust:	7 kPa (2.1 in Hg) exhaust restriction, 75 mm (2.95 in) inner diameter pipe

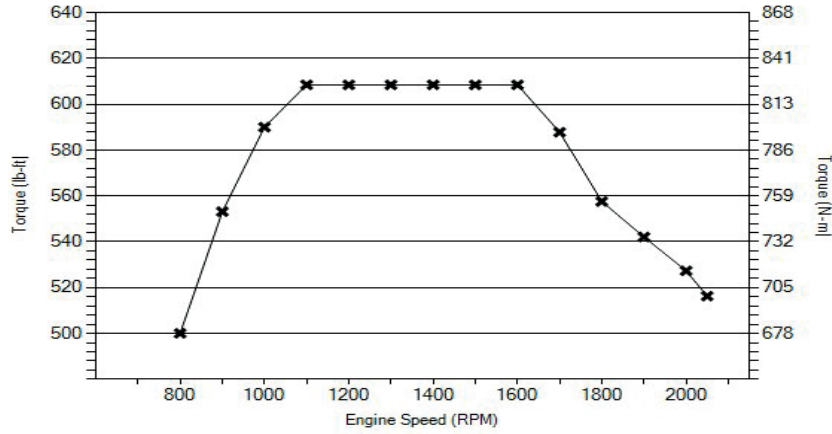
The alternator, fan, optional equipment and driven components are not included.  
 Coolant flows and heat rejection data is based on a coolant mixture of 50% ethylene glycol and 50% water.  
 All data is subject to change without notice.

Curves shown above represent gross engine performance capabilities obtained and corrected in accordance with SAE J1995 conditions of 100 kPa (29.61 in Hg) barometric pressure [91 m (300 ft) altitude], 25 °C (77 °F) inlet air temperature, and 1 kPa (0.30 in Hg) water vapor pressure with No. 2 diesel fuel.

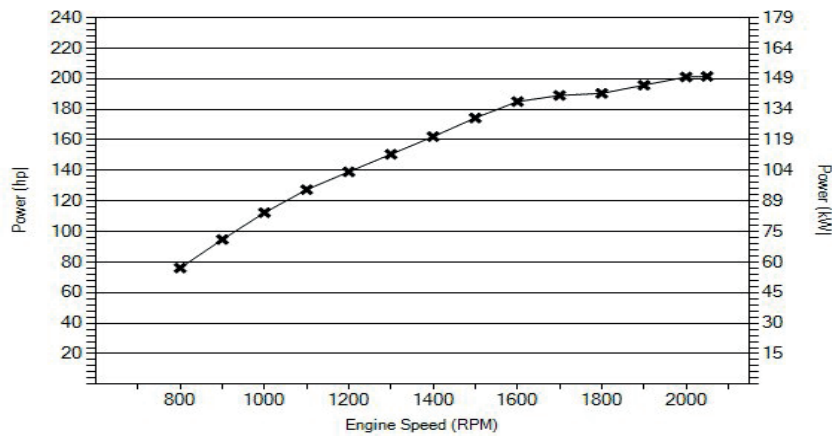
The engine operates successfully at hot tropic ambient temperature of +55 °C with temperature correction derate factor 2% per every 11°C above 25°C ( 77°F).



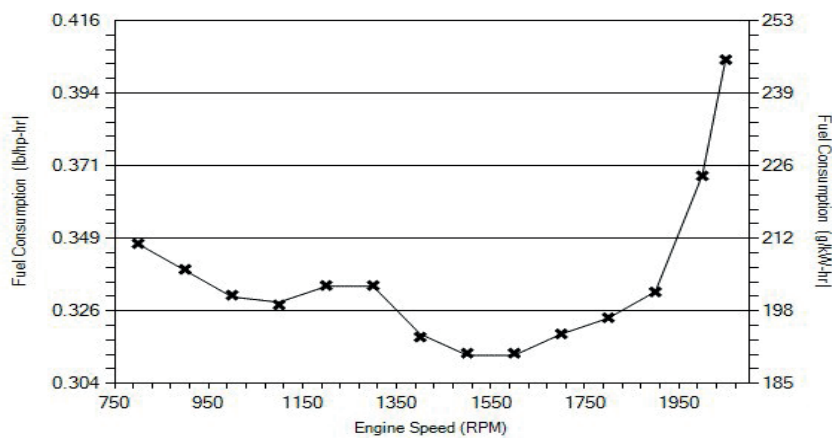
## ENGINE PERFORMANCE DATA 3/5



Torque Output		
RPM	lb-ft	N-m
2050	516	700
2000	527	715
1900	542	735
1800	558	756
1700	588	797
1600	608	825
1500	608	825
1400	608	825
1300	608	825
1200	608	825
1100	608	825
1000	590	800
900	553	750
800	500	678



Power Output		
RPM	hp	kW
2050	202	150
2000	201	150
1900	196	146
1800	190	142
1700	189	141
1600	185	138
1500	174	130
1400	162	121
1300	151	112
1200	139	104
1100	127	95
1000	112	84
900	95	71
800	76	57



Fuel Consumption		
RPM	lb/hp-hr	g/kW-hr
2050	0.404	246
2000	0.368	224
1900	0.332	202
1800	0.324	197
1700	0.319	194
1600	0.313	190
1500	0.313	190
1400	0.318	194
1300	0.334	203
1200	0.334	203
1100	0.328	200
1000	0.331	201
900	0.339	206
800	0.347	211



**ENGINE PERFORMANCE DATA 4/5**

**INTAKE AIR SYSTEM**

Maximum allowable air temperature rise over ambient at intake manifold (naturally aspirated engines) or turbo compressor inlet (turbo-charged engines): \*This parameter impacts emissions, LAT, and/or altitude capability

30.6 delta °F      17 delta °C

**COOLING SYSTEM**

Maximum charge air cooler outlet to ambient at 25 deg C (77 deg F) (CAC dT)

63 delta °F      35 delta °C

Maximum CAC outlet temperature at less than or equal to 25 deg C (77 deg F) ambient

140 °F      60 °C

Maximum allowable pressure drop across charge air cooler and OEM CAC piping (IMPD)

4 in-Hg      13.5 kPa

Maximum coolant temperature for engine protection controls

235 °F      113 °C

Maximum coolant operating temperature at engine outlet (max. top tank temp)

225 °F      107 °C

**EXHAUST SYSTEM**

Maximum exhaust backpressure imposed by exhaust system (at soot level after DPF regeneration or cleaning, when DPF is present)

3 in-Hg      10 kPa

Recommended exhaust pipe size (inner diameter)

3 in      75 mm

**CENTRAL LUBRICATION SYSTEM**

Nominal operating oil pressure at minimum low idle

15.5 psi      107 kPa

Nominal operating oil pressure at maximum rated speed

46.6 psi      321 kPa

Minimum engine oil pressure at minimum low idle (for engine protection devices)

10.2 psi      70 kPa

**FUEL SYSTEM**

\*Fuel cooling requirements with diesel fuel

Maximum supply fuel flow

452 lb/hr      205 kg/hr

Maximum return fuel flow

337 lb/hr      153 kg/hr

Engine fuel compatibility (consult Service Bulletin #3379001 for appropriate use of other fuels)

B20, B5, DF1, DF2

Maximum fuel inlet pressure

15 psi      100 kPa

# AMPHIBIOUS EXCAVATOR GDS SE 220

## PERFORMANCE DATA

Maximum low idle speed:	1200 RPM
Minimum low idle speed:	600 RPM
Minimum engine speed for full load sustained operation:	1300 RPM
Maximum overspeed capability (15 second maximum):	3750 RPM
Maximum continuous power:	150 kW (201 hp)
Maximum continuous speed:	2050 RPM

	Governed Power	Maximum Power	Peak Torque
Engine Speed	2050 RPM	1900 RPM	1100 RPM
Output Power	150 kW (201 hp)	150 kW (201 hp)	95 kW (127 hp)
Torque	700 N-m (516 lb-ft)	756 N-m (558 lb-ft)	825 N-m (608 lb-ft)
Motoring Power	27 kW (36 hp)	24 kW (32 hp)	16 kW (21 hp)
Intake Manifold Pressure	154 kPa (46 in-Hg)	140 kPa (41 in-Hg)	80 kPa (24 in-Hg)
Turbo Comp. Outlet Pressure	166 kPa (49.2 in-Hg)	151 kPa (44.7 in-Hg)	109 kPa (32.3 in-Hg)
Turbo Comp. Outlet Temperature	153 deg C (307 deg F)	143 deg C (290 deg F)	103 deg C (217 deg F)
Inlet Air Flow	231 L/s (490 ft3/min)	206 L/s (436 ft3/min)	94 L/s (200 ft3/min)
Charge Air Flow	16.4 kg/min (36.2 lb/min)	15 kg/min (32 lb/min)	7 kg/min (15 lb/min)
Exhaust Gas Flow	600 L/s (1271 ft3/min)	464 L/s (983 ft3/min)	257 L/s (545 ft3/min)
Exhaust Gas Temperature	544 deg C (1011 deg F)	414 deg C (777 deg F)	515 deg C (958 deg F)
Maximum Fuel Flow to Pump	205 kg/hr (452 lb/hr)		
Heat Rejection to Coolant	79.7 kW (4532 BTU/min)	62.3 kW (3543 BTU/min)	48.5 kW (2758 BTU/min)
Heat Rejection to Fuel	1 kW (57 BTU/min)	1 kW (57 BTU/min)	1 kW (57 BTU/min)
Heat Rejection to Ambient	10 kW (562 BTU/min)	6 kW (343 BTU/min)	7 kW (373 BTU/min)
Heat Rejection to Exhaust	156 kW (8849 BTU/min)	103 kW (5869 BTU/min)	64 kW (3617 BTU/min)

\*When operating Naturally Aspirated engines above SAE J1995 conditions, it should be noted that smoke levels will increase due to combustion inefficiencies associated with a reduction in the air to fuel mixture.

## CRANKING SYSTEM (COLD STARTING CAPABILITY)

Minimum cranking speed	120 RPM	120 RPM
Maximum OEM parasitic load at 10 deg F and minimum cranking speed	258 lb-ft	350 N-m
Required Starting Aids:	Intake Air Heater Required	

Minimum ambient temperature for unaided cold start at maximum OEM parasitic load	10.4 °F	-12 °C
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Minimum ambient temperature with grid heater only at maximum OEM parasitic load	-26 °F	-32 °C
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\*Cranking System data obtained with all required starting aids before over crank protection limits.

## NOISE EMISSIONS

Top:	92.8 decibels
Right Side:	94.3 decibels
Left Side:	93.8 decibels
Front:	92.1 decibels
Exhaust noise emissions:	114.2 decibels

\*Estimated free field sound pressure level at 1m (3.28ft) and full-load governed speed. Excludes noise from intake, exhaust, cooling system, and driven components.

## SE220 HYDRAULIC CRAWLER EXCAVATOR (LONG BOOM AND ARM) TECHNICAL SPECIFICATIONS



### ENGINE

**Model** CUMMINS QSB 6.7  
**Type** High pressure, water cooling, in line direct mechanical injection fuel system turbocharging  
**No. of cylinder** 6  
**Bore and stroke** 107 x 124 mm  
**Displacement** 6.7 L  
**Power output** 150 kW/2050rpm



### HYDRAULIC SYSTEM

**Pump** Kawasaki, Japan  
**Type** variable plunger-piston pump  
**Max. discharge flow** 2x213L/min

#### MAX. DISCHARGE PRESSURE

**Boom, arm and bucket** 34.3 MPa  
**Travel circuit** 34.3 MPa  
**Swing circuit** 25.5 MPa  
**Control circuit** 3.9 MPa  
**Pilot control pump** Gear pump  
**Main control valve** Positive control  
**Oiler cooler** Air cooled type



### CAB & CONTROL

#### CAB ROPs type

Air conditioner, heater, mirror GPS. All-weather, sound-suppressed Cab and equipped with a heavy, insulated Floor Mat; Front Window can be opened and slid; 6-direction adjustable Seat; LED display, Automatic monitoring, display and warning; cool & hot Air Conditioner

#### CONTROL

Two hand levers and two foot pedals for travel; two hand levers for excavating and swing; Electric rotary-type engine throttle



### SWING SYSTEM

**Swing motor** Kawasaki, Japan  
**Swing motor type** Oblique plate piston motor  
**Brake** Pressure released  
**Parking brake** Mechanical brake  
**Swing speed** 0-11r/min



### REFILLING CAPACITIES & LUBRICATIONS

**Fuel tank** 360L  
**Cooling system** 28L  
**Engine oil** 20L  
**Hydraulic oil tank** 220L Tank oil level  
 400L Hydraulic system



### BUCKET

**Type** Backhoe bucket  
**Bucket capacity** 0.80m<sup>3</sup> (SAE)  
**Cleaning bucket** 0.65<sup>3</sup>

## PONTOONS 1/4

The amphibious excavator (undercarriage) is completely self-propelled. It can access virtually any soft terrains where standard excavators would sink.

All exposed metal is covered with high-quality primer and colour useable for salty water.

The ratio of floating capacity to operation weight is equal or greater than 1,4.

Heavy duty strand truck chain, 3-fold-guided. The track shoes are made from heavy duty steel hollow-material. There will be no problems with damaging of plates, like in aluminum quality, or only 2-fold-guided plates. The steel plates give a low required maintenance, even an easy maintenance.

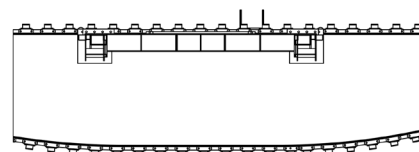
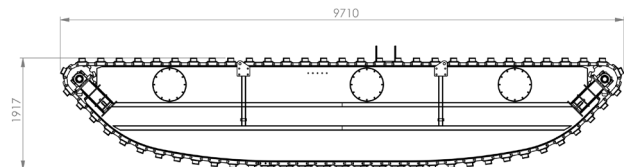
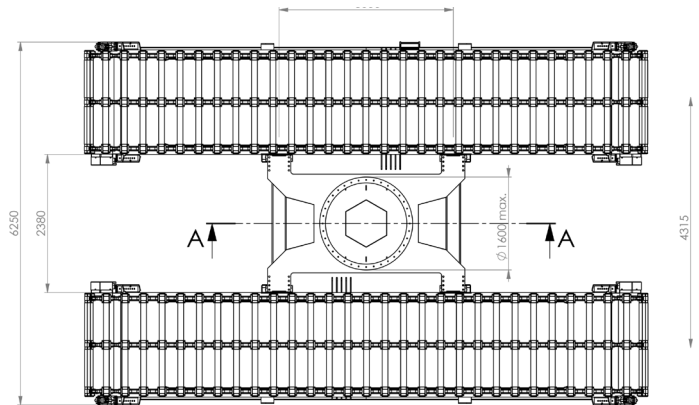
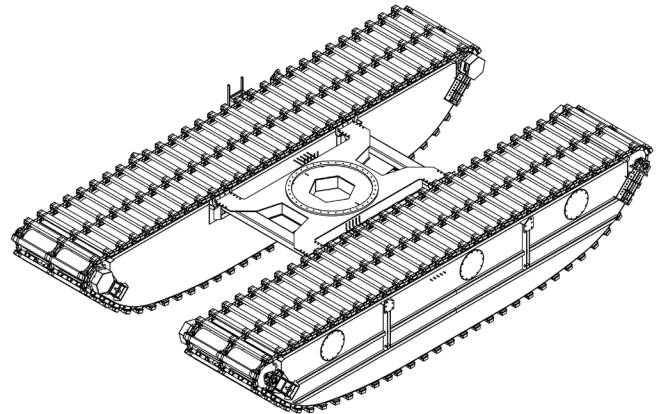
**Pontoon structure (tensile strength, atmospheric corrosion resistance) better to be (core-ten alloy steel). Three chain stands per each side (track) (4 inch pitch) designed for heavy duty.**

Each pontoon should be equipped with (1) hydraulic motor. All undercarriage hoses and pipes should be equipped with oil valves to prevent oil leaks when dismantling the amphibious excavator.

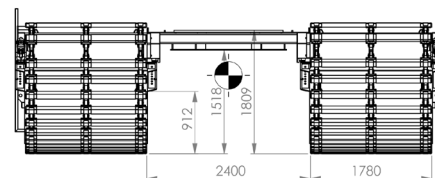
The track system consists of three chain stands per each side (track), specially designed from heavy duty, stronger system + longer track life.

The pitch per each side is appr. 4,5 inch. The track chains are installed with hardened rollers.

This system matches pontoon wear to roller wear and keeps the chain properly aligned.



SECTION A-A

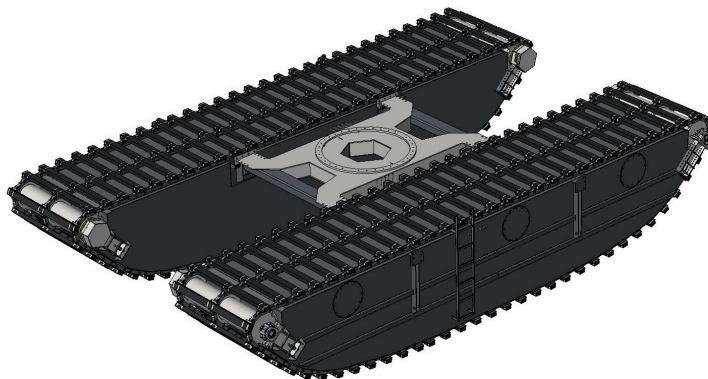


## PONTOONS 2/4

The pontoon undercarriage system is designed to be able to float on water as an added safety feature. It has 3 watertight compartments, hermetically sealed with individual manholes for easy access from the outside for inspection and preventive maintenance.

### A. TRACK CHAIN

Each pontoon comes with 2 or 3 strands (model dependent) of heavy duty track chains, constructed with high strength steel. Track shoes/cleats supported by multiple strands of track chains provide the advantage of uniform pulling force and superior weight distribution across each track shoe/cleat.



### B. TYPE DESIGNATION

MACHINE NAME	MODEL	YEAR	MAX speed
Amphibious Excavator	GDS SE 220	2022	5 km/h
UNIT WEIGHT	MAX FLOW PER track	MAX pressure	
32.000 kg	236 l/min	350 Bar	

### C. TECHNICAL SPECIFICATIONS

#### POWER

Hydraulic power: 218 Kw  
 Max. Torque: 93352 Nm  
 Max. Pulling power: 359 kN  
 Max. speed: 5 km/h

#### HYDRAULICS

Max. hydraulic power: 218 Kw  
 Nominal pressure: 250 Bar  
 Max. pressure: 350 Bar  
 Required flow: 2x236 l/min

#### DIMENSIONS

Dimensions total undercarriage:  
 9750x6350x1917 mm L x W x H  
 Dimensions one track:  
 9750x2315x191 mm L x W x H  
 Dimensions midframe:  
 3400x2350x425 mm L x W x H  
 Ground pressure: 0,15 kg/cm<sup>2</sup>



## PONTOONS 3/4

Hydraulic			
Connection	Function	Size	Pressure
1	A-port (pressure 250bar max.)	G1"	250bar (350max.)
2	B-port (pressure 250bar max.)	G1"	250bar (350max.)
3	D-port Drain port of equipment	G3/4"	Pressureless (2bar max.)
4	P4-Port (high/low speed)	G1/4"	20-69bar

## D. DOOSAN HYDRAULIC

Doosan brand hydraulic parts, oil pump intelligent control, achieve the power matching with loads for the amphibious excavator, minimize fuel consumption and minimize system radiation to guarantee the reliable performance.

## E. OIL

### HYDRAULIC OIL

Permitted pressure fluids  
ISO VG32~46 or equivalent

### GEAR OIL

API GL-4 or 5 containing extreme pressure additive SAE 80W90

Capacity: 2,2L

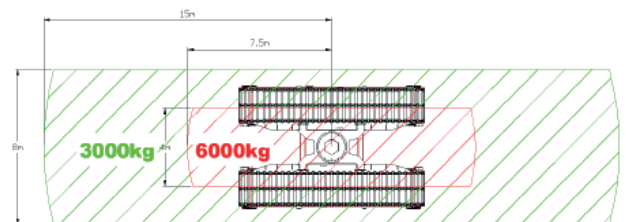
Track lubricant

Penetrating chain lubricant

Make sure the track is dry, then spray between the hinges

## F. LOAD

The loads and distances below as a guideline.  
These values are based on a 15 ton superstructure.  
Different superstructures may result in different values.



## PONTOONS 4/4

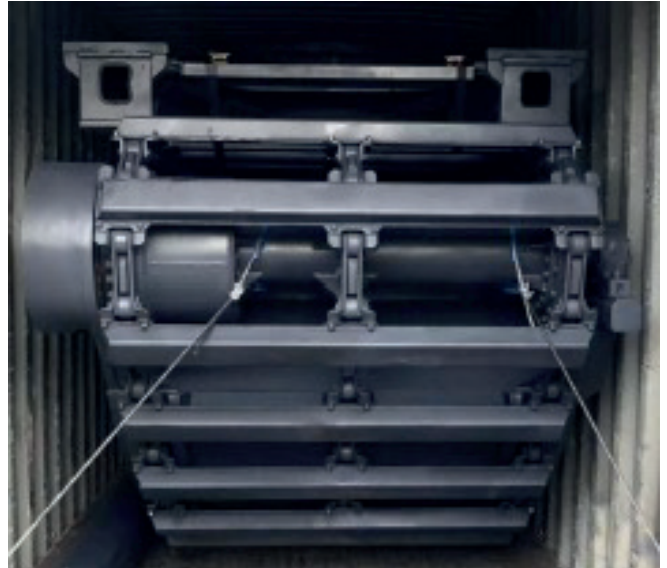
### G. TRACK SHOES

Special designed marine steel heavy duty track chains: 3 strands track chains, every plate is hollow like a separate pontoon.

### H. SHIPPING ON SITE

The machine can be shipped in three parts, and a few smaller parts. Normally the client needs three trucks to ship from one place to another or 3 standard seafreight 40 ft. containers.

**3 trucks to ship =**  
2 trucks for crawlers and small parts +  
1 truck for the uppercarriage,  
with the boom-set



2 trucks for crawlers and small parts



1 truck for the uppercarriage, with the boom-set



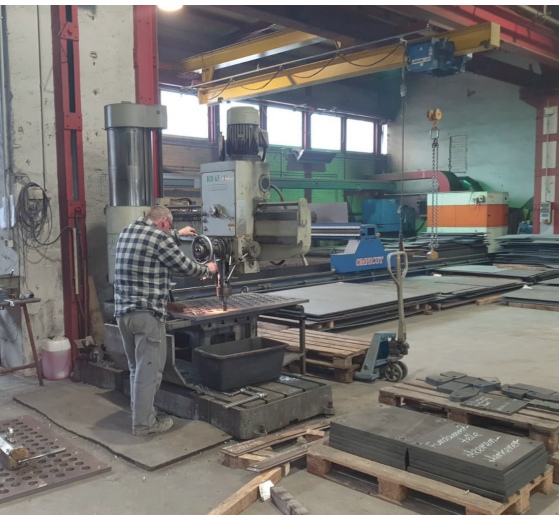
### GDS PRESENTS ITS PARTNERS



GDS was founded with the aim of completely brand new production of customized amphibious excavators in the field of hydraulic engineering, as well as developing and modifying them technically for the use in swampy areas.

From construction support to plant consulting, project planning, service and maintenance including spare parts business we are able to offer a complete package from a single source. We engineer and supply backhoe dredgers as well as amphibious excavators with backup service worldwide based on customer requirements and latest international standards.

**GDS is an authorized service partner of Komatsu Germany and as such operating worldwide. There are also successful partnerships with IAB Group GmbH and Dredgers & Pumps GmbH.**





## CONTACT

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