SECTION 1 GENERAL

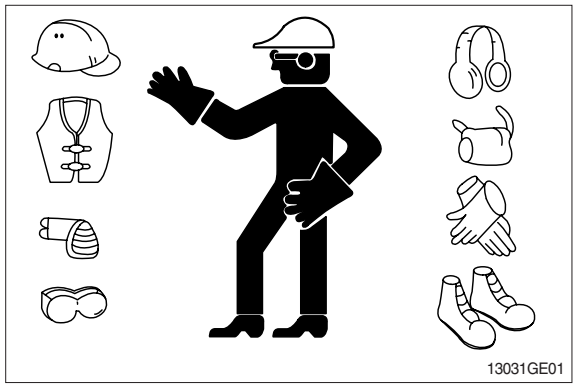
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

Unsafe work practices are dangerous. Understand service procedure before doing work; Do not attempt shortcuts.

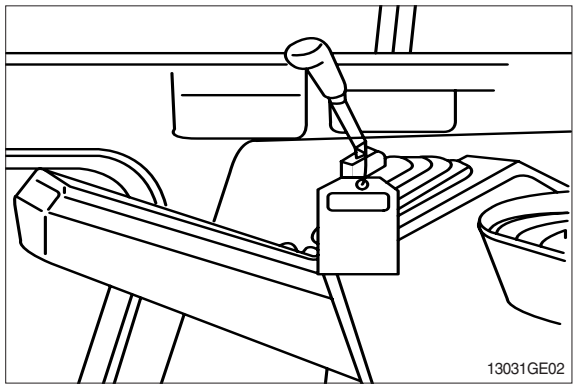
WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.



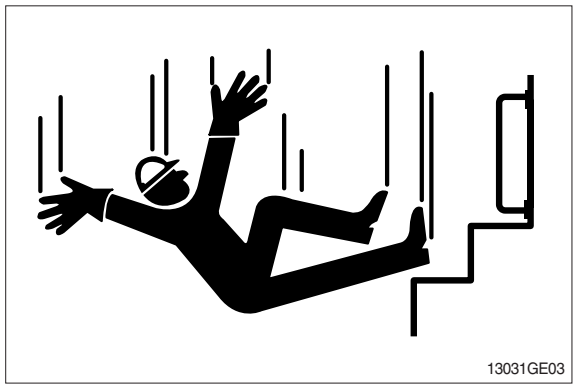
WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.
Before performing any work on the excavator, attach a 「**Do Not Operate**」 tag on the right side control lever.



USE HANDHOLDS AND STEPS

Falling is one of the major causes of personal injury.
When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.
Never jump on or off the machine. Never mount or dismount a moving machine.
Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.

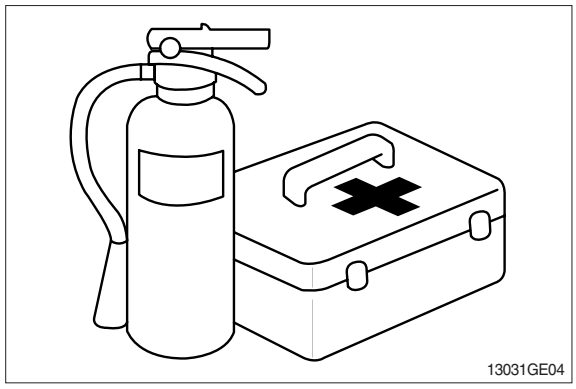


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

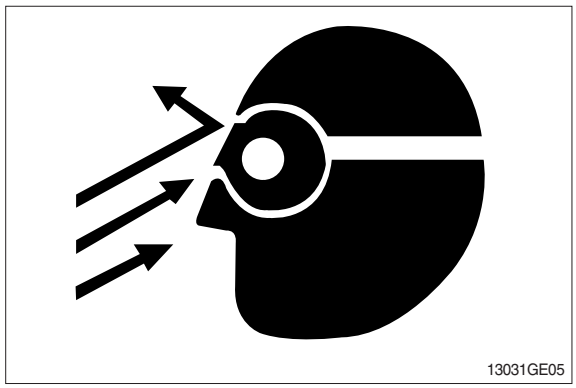
Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



PROTECT AGAINST FLYING DEBRIS

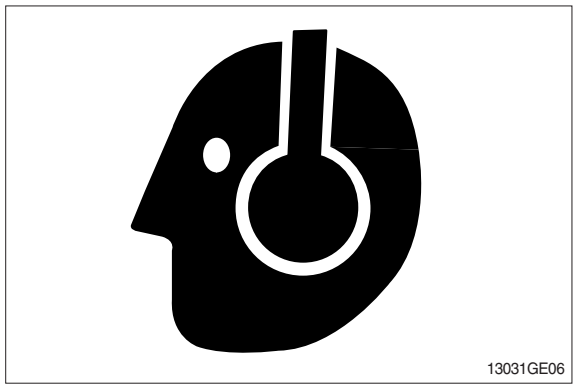
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing.

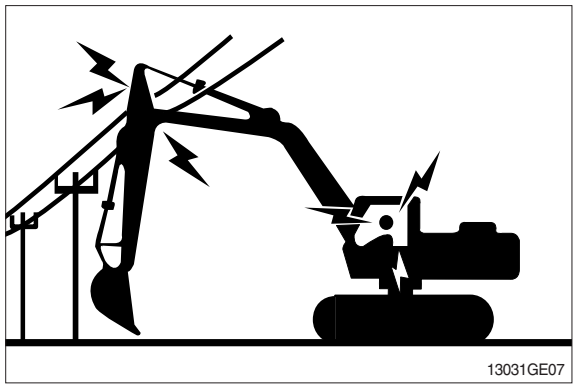
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



AVOID POWER LINES

Serious injury or death can result from contact with electric lines.

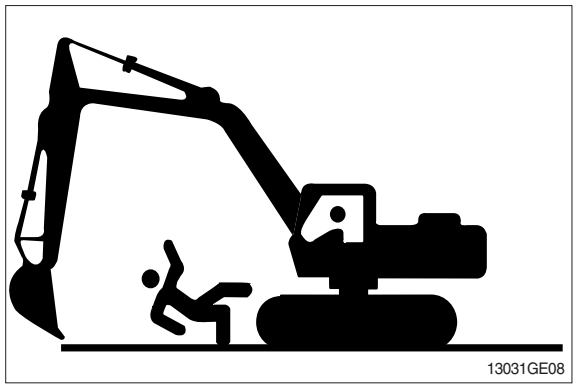
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



KEEP RIDERS OFF EXCAVATOR

Only allow the operator on the excavator. Keep riders off.

Riders on excavator are subject to injury such as being struck by foreign objects and being thrown off the excavator. Riders also obstruct the operator's view resulting in the excavator being operated in an unsafe manner.

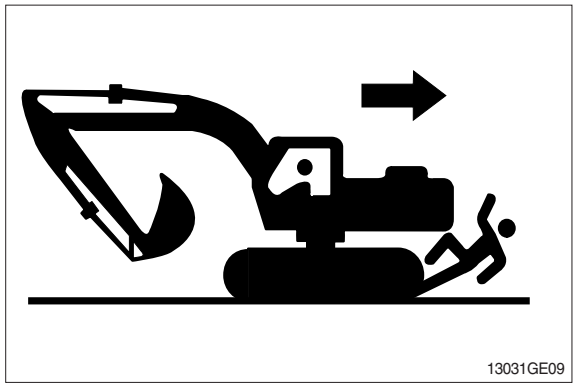


MOVE AND OPERATE MACHINE SAFELY

Bystanders can be run over. Know the location of bystanders before moving, swinging, or operating the machine.

Always keep the travel alarm in working condition. It warns people when the excavator starts to move.

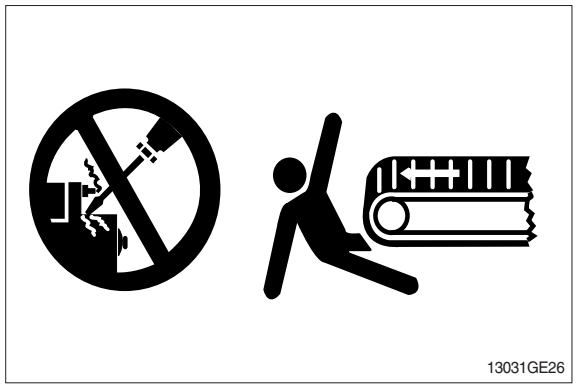
Use a signal person when moving, swinging, or operating the machine in congested areas. Coordinate hand signals before starting the excavator.



OPERATE ONLY FORM OPERATOR'S SEAT

Avoid possible injury machine damage. Do not start engine by shorting across starter terminals.

NEVER start engine while standing on ground. Start engine only from operator's seat.



PARK MACHINE SAFELY

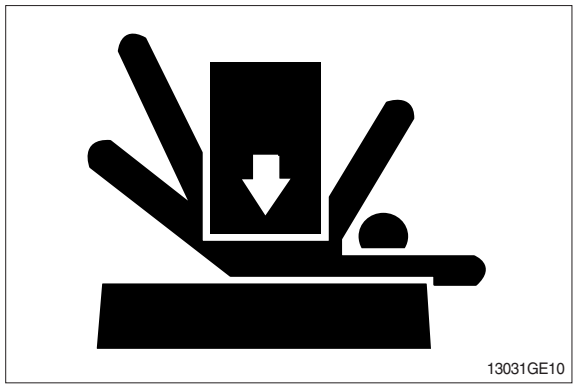
Before working on the machine:

- Park machine on a level surface.
- Lower bucket to the ground.
- Turn auto idle switch off.
- Run engine at 1/2 speed without load for 2 minutes.
- Turn key switch to OFF to stop engine. Remove key from switch.
- Move pilot control shutoff lever to locked position.
- Allow engine to cool.

SUPPORT MACHINE PROPERLY

Always lower the attachment or implement to the ground before you work on the machine. If you must work on a lifted machine or attachment, securely support the machine or attachment.

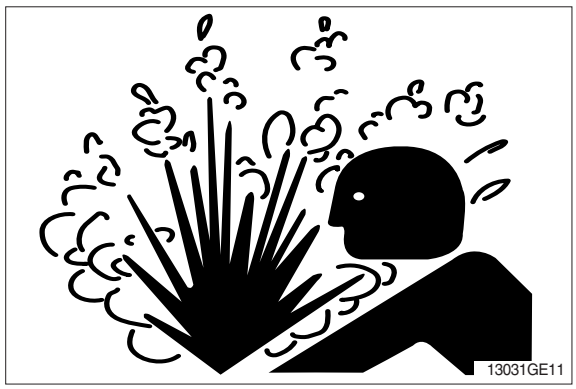
Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load.
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



SERVICE COOLING SYSTEM SAFELY

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands.



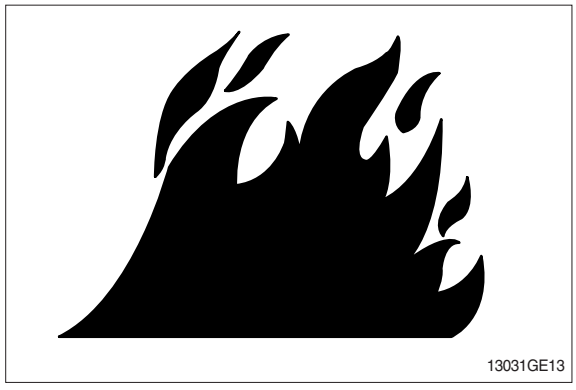
HANDLE FLUIDS SAFELY-AVOID FIRES

Handle fuel with care; It is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks. Always stop engine before refueling machine.
Fill fuel tank outdoors.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

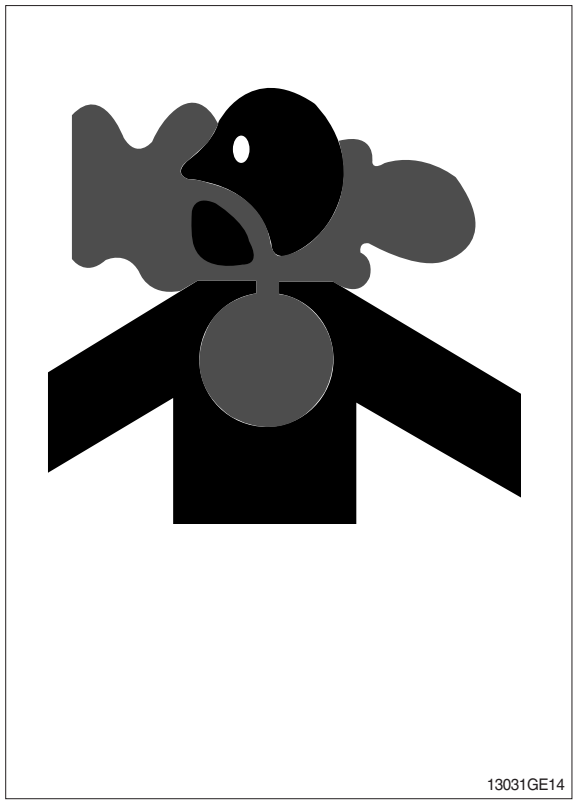
Do not store oily rags; They can ignite and burn spontaneously.



BEWARE OF EXHAUST FUMES

Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.

If you must operate in a building, be positive there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.



REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

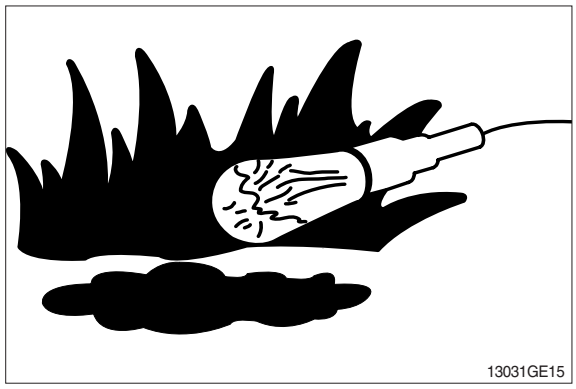
Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

- If you sand or grind paint, avoid breathing the dust.
  Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

ILLUMINATE WORK AREA SAFELY

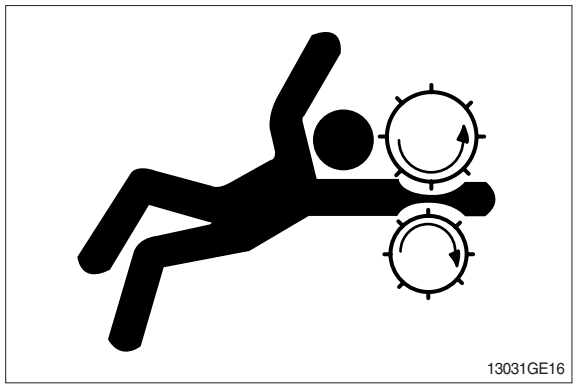
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



SERVICE MACHINE SAFELY

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

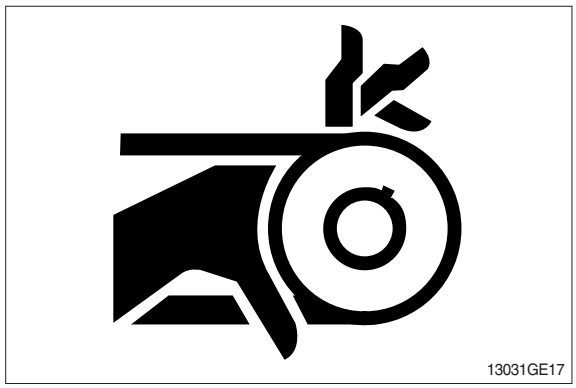
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

To prevent accidents, use care when working around rotating parts.



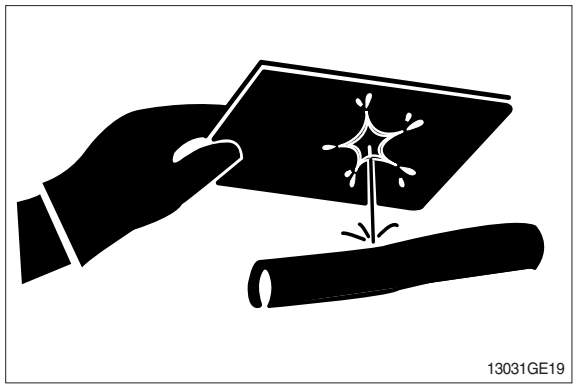
AVOID HIGH PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.



AVOID HEATING NEAR PRESSURIZED FLUID LINES

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.

Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install fire resisting guards to protect hoses or other materials.


13031GE20

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; It may explode. Warm battery to 16˚C (60˚F).


13031GE21

PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

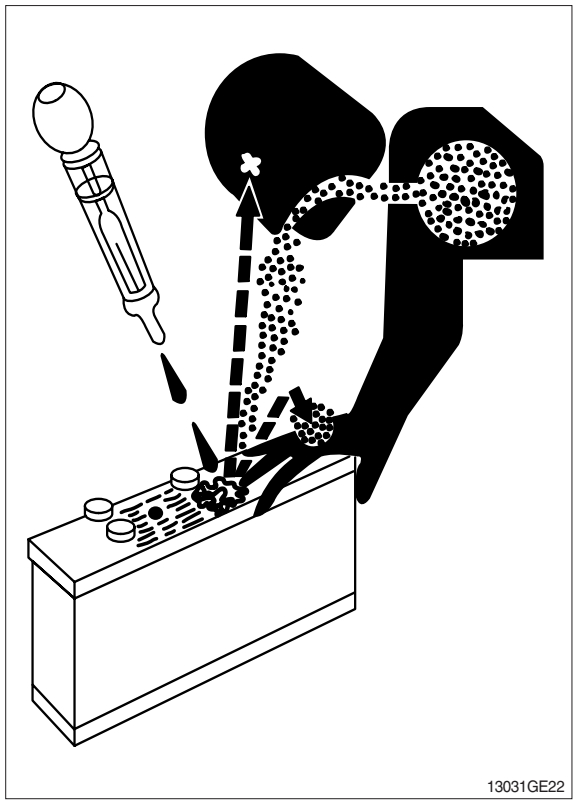
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling of dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 10-15 minutes. Get medical attention immediately.

If acid is swallowed:

1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.



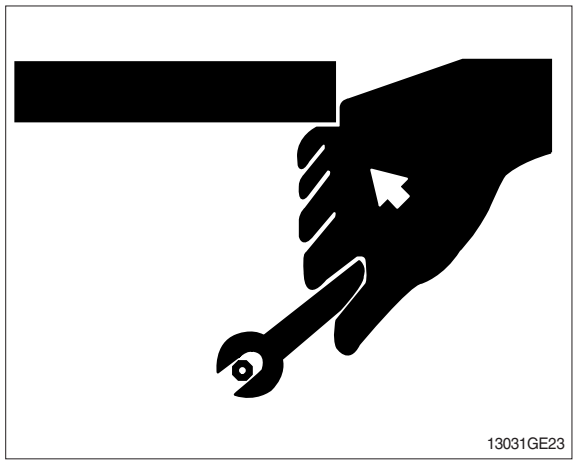
USE TOOLS PROPERLY

Use tools appropriate to the work. Makeshift tools, parts, and procedures can create safety hazards.

Use power tools only to loosen threaded tools and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only recommended replacement parts. (See Parts catalogue.)

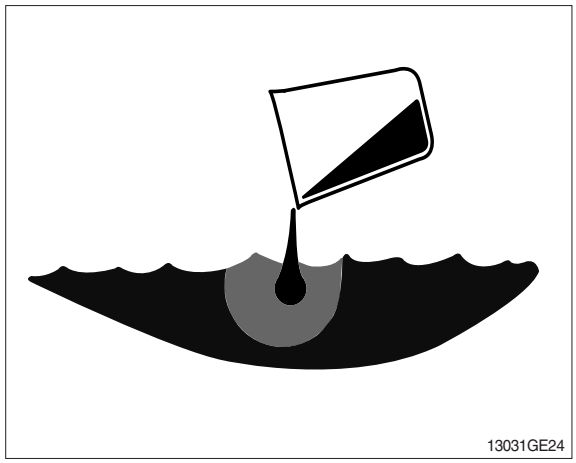


DISPOSE OF FLUIDS PROPERLY

Improperly disposing of fluids can harm the environment and ecology. Before draining any fluids, find out the proper way to dispose of waste from your local environmental agency.

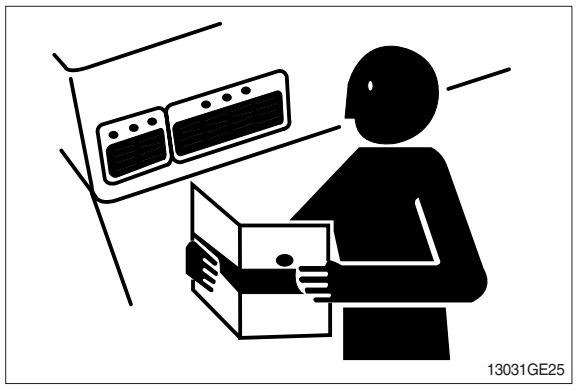
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

DO NOT pour oil into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters, batteries, and other harmful waste.



REPLACE SAFETY SIGNS

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

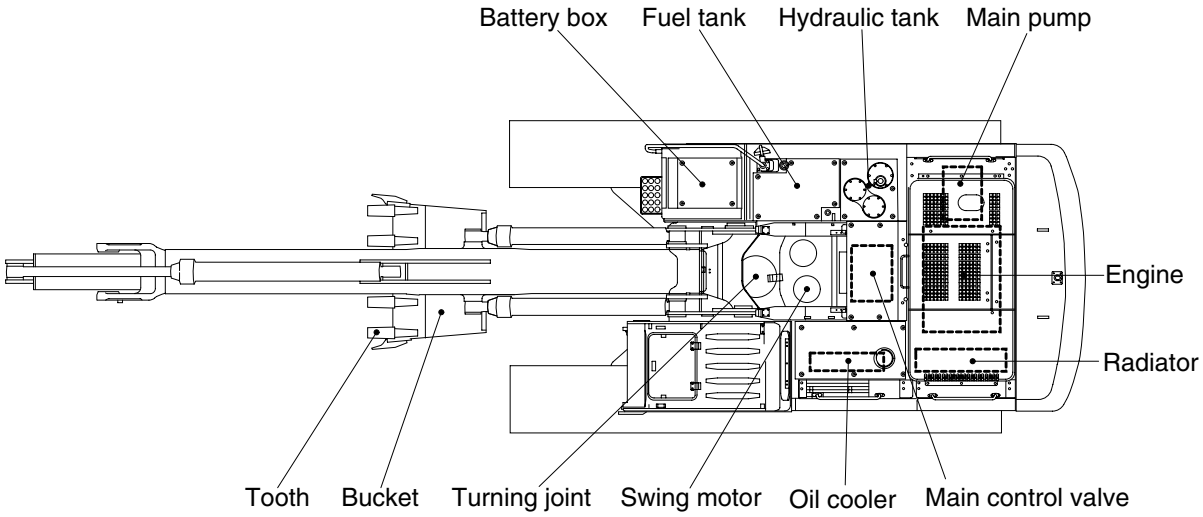


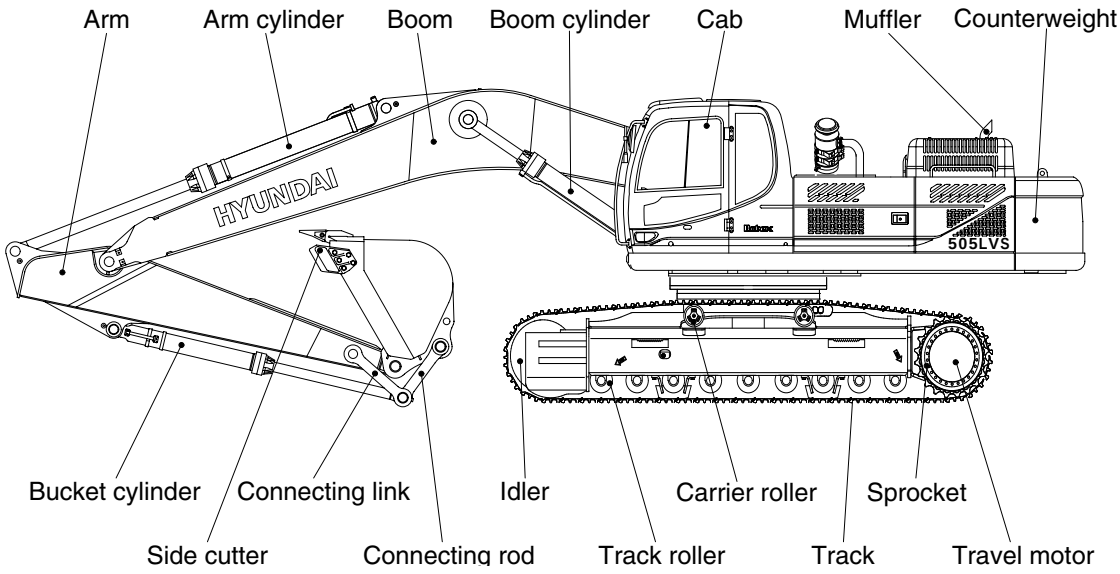
LIVE WITH SAFETY

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

GROUP 2 SPECIFICATIONS

1. MAJOR COMPONENT

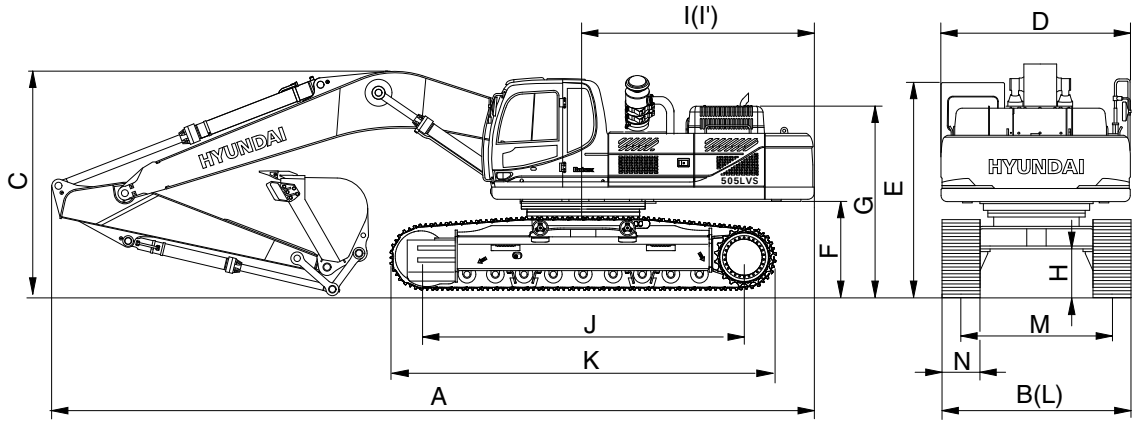




2.SPECIFICATIONS

1) R505LVS

6.55m (21' 6") BOOM, 2.9m (9' 6") ARM

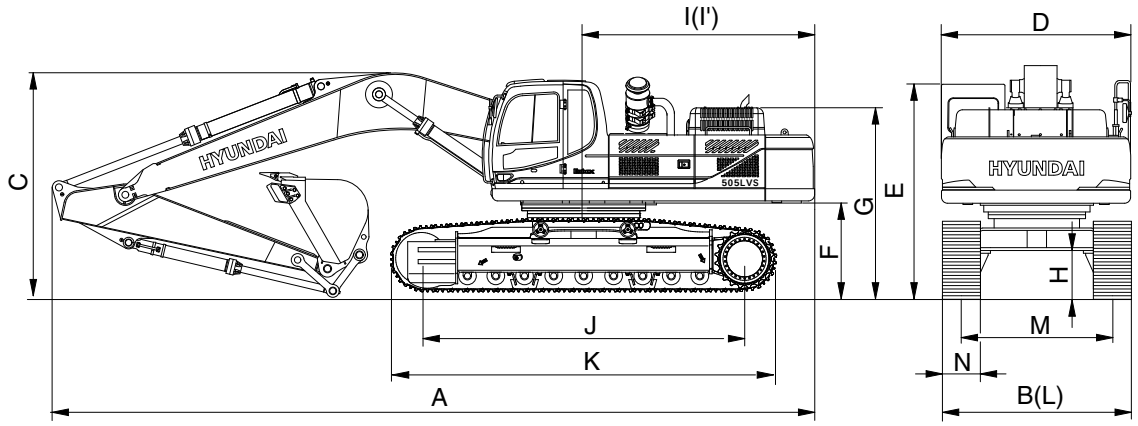


Description		Unit	Specification
Operating weight		kg (lb)	50200 (110673)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.79(3.65)
Overall length	A	mm (ft-in)	11710 (38' 5")
Overall width, with 600 mm shoe	B		3340 (10' 11")
Overall height	C		3810 (12' 6")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3190 (10' 6")
Ground clearance of counterweight	F		1275 (4' 2")
Engine cover height	G		2770 (9' 1")
Minimum ground clearance	H		575(1' 11")
Rear-end distance	I		3750 (12' 4")
Rear-end swing radius	I'		3780(12' 5")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5510(18' 1")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr	3.4/5.4
Swing speed		rpm	9.2
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.88(12.53)
Max traction force		kg (lb)	34100 (75178)

2.SPECIFICATIONS

1) R505LVS

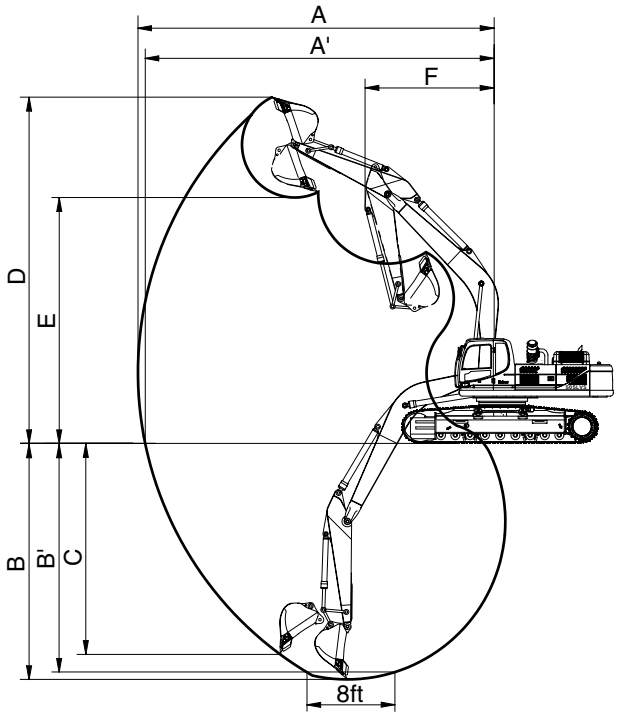
· 7.06m(23' 2") BOOM and 3.38m(11' 1") ARM



Description		Unit	Specification
Operating weight		kg (lb)	50600 (111554)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	2.79 (3.65)
Overall length	A	mm (ft-in)	12075 (39' 7")
Overall width, with 600mm shoe	B		3340 (10' 11")
Overall height	C		3870 (12' 8")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3325 (10' 11")
Ground clearance of counterweight	F		1305 (4' 4")
Engine cover height	G		2770 (9' 1")
Minimum ground clearance	H		575 (1' 11")
Rear-end distance	I		3750 (12' 4")
Rear-end swing radius	I'		3780 (12' 5")
Distance between tumblers	J		4470 (14' 8")
Undercarriage length	K		5510 (18' 1")
Undercarriage width	L		3340 (10' 11")
Track gauge	M		2740 (8' 12")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.4/5.4 (2.1/3.3)
Swing speed		rpm	9.2
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2 (psi)	0.88 (12.53)

3.WORKING RANGE

· 6.55 m (21' 6") BOOM

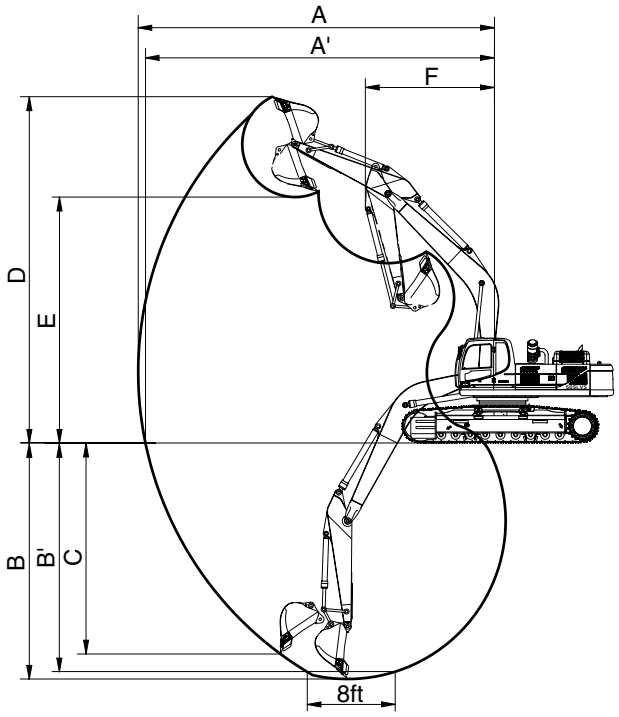


Description		STD *2.9 m (9' 6") Arm
Max digging reach	A	11050mm (36'3")
Max digging reach on ground	A'	10830 mm (35' 6")
Max digging depth	B	6900mm (22'8")
Max digging depth (8ft level)	B'	6740mm (22' 1")
Max vertical wall digging depth	C	4570mm (15' 0")
Max digging height	D	10280 mm (33 9")
Max dumping height	E	6990 mm (22' 11")
Min swing radius	F	4530mm (14' 10")
Bucket digging force	SAE	239.9 [261.7] kN
Arm crowd force	SAE	220.6 [240.7] kN

[ ] : Power boost

3.WORKING RANGE

- **7.06 m (23' 2") BOOM**



Description		STD *3.38m (11' 1") Arm
Max digging reach	A	12015mm (39' 5")
Max digging reach on ground	A'	11821 mm (38' 9")
Max digging depth	B	7777mm (25' 6")
Max digging depth (8ft level)	B'	7633mm (25' 1")
Max vertical wall digging depth	C	4864mm (15' 12")
Max digging height	D	10888mm (35' 9")
Max dumping height	E	7619mm (24' 12")
Min swing radius	F	4773mm (15' 8 ")
Bucket digging force	SAE	243.4[265.6] kN
Arm crowd force	SAE	193.3[210.8] kN

[ ] : Power boost

4. WEIGHT

(1) 6.55 m (21' 6") boom, 2.9 m (9' 6") arm equipped with 2.79 m^3 (SAE heaped) bucket and 600 mm (24") double grouser shoe and 10200 kg counterweight.

Item	R505LVS	
	kg	lb
Upperstructure assembly	20000	44090
Main frame weld assembly	4430	9770
Engine assembly	940	2070
Main pump assembly	190	420
Main control valve assembly	420	930
Swing motor assembly	230	510
Hydraulic oil tank assembly	450	990
Fuel tank assembly	270	600
Counterweight	10200	22490
Cab assembly	490	1080
Lower chassis assembly	19000	41890
Track frame weld assembly	7060	15570
Swing bearing	720	1590
Travel motor assembly	440	970
Turning joint	50	110
Track recoil spring	310	680
Idler	250	550
Carrier roller	80	180
Track roller	80	180
Track-chain assembly (600 mm standard double grouser shoe)	2700	5950
Front attachment assembly (6.55 m boom, 2.9 m arm, 2.79m^3 SAE heaped bucket)	9320	20540
6.55 m boom assembly	3590	7910
2.9m arm assembly	1800	3970
2.79m^3 SAE heaped bucket	2980	6570
Boom cylinder assembly	830	1830
Arm cylinder assembly	630	1390
Bucket cylinder assembly	300	660
Bucket control rod assembly	155	340

4. WEIGHT

(2) 7.06 m (23' 2") boom, 3.38 m (11' 1 ") arm equipped with 2.79 m^3 (SAE heaped) bucket and 600 mm (24") double grouser shoe and 10200 kg (22487 lb) counterweight.

Item	R505LVS	
	kg	lb
Upperstructure assembly	20500	45195
Main frame weld assembly	4430	9770
Engine assembly	940	2070
Main pump assembly	190	420
Main control valve assembly	420	930
Swing motor assembly	230	510
Hydraulic oil tank assembly	450	990
Fuel tank assembly	270	600
Counterweight	10200	22487
Cab assembly	490	1080
Lower chassis assembly	19000	41890
Track frame weld assembly	7060	15570
Swing bearing	720	1590
Travel motor assembly	440	970
Turning joint	50	110
Track recoil spring	310	680
Idler	250	550
Carrier roller	80	80
Track roller	80	180
Track-chain assembly (600 mm standard double grouser shoe)	2700	5950
Front attachment assembly (7.06 m boom, 3.38 m arm, 2.79 m^3 SAE heaped bucket)	9998	22042
7.06m boom assembly	3540	7617
3.38 m arm assembly	1755	3869
2.79 m^3 SAE heaped bucket	2980	6570
Boom cylinder assembly	740	1631
Arm cylinder assembly	586	1292
Bucket cylinder assembly	397	875
Bucket control rod assembly	171	377

5. LIFTING CAPACITIES

(1) 6.55 m (21' 6") boom, 2.9 m (9' 6") arm equipped with 2.79 m³ (SAE heaped) bucket and 600 mm (24") double grouser shoe and 10200 kg counterweight.

· : Rating over-front · : Rating over-side or 360 degree

Lift-point height (m/ft)		Lift-point radius										At max. reach		
		3.0m(9.8ft)		4.5m(14.8ft)		6.0m(19.7ft)		7.5m(24.6ft)		9.0m(29.5ft)		Capacity		Reach
														m (ft)
7.5m	kg											*7000	*7000	7.47
24.6ft	**lb**											***15430**	***15430**	**(24.5)**
6.0m	kg							*9140	8140			*7070	6460	8.35
19.7ft	**lb**							***20150**	**17950**			***15590**	**14240**	**(27.4)**
4.5m	kg			*15760	*15760	*11920	11700	*9850	7770			*7470	5440	8.89
14.8ft	**lb**			***34740**	***34740**	***26280**	**25790**	***21720**	**17130**			***16470**	**11990**	**(29.2)**
3.0m	kg			*19350	17100	*13620	10780	*10720	7310	*8970	5090	*8220	4900	9.16
9.8ft	**lb**			***42660**	**37700**	***30030**	**23770**	***23630**	**16120**	***19780**	**11220**	***18120**	**10800**	**(30.1)**
1.5m	kg			*21490	15670	*14950	10010	*11430	6880	*9240	4880	*9020	4690	9.17
4.9ft	**lb**			***47380**	**34550**	***32960**	**22070**	***25200**	**15170**	***20370**	**10760**	***19890**	**10340**	**(30.1)**
水平面	kg			*21640	15110	*15460	9530	*11730	6580			*9270	4800	8.93
	lb			***47710**	**33310**	***34080**	**21010**	***25860**	**14510**			***20440**	**10580**	**(29.3)**
−1.5m	kg	*18790	*18790	*20380	15050	*15010	9350	*11350	6460			*9520	5300	8.42
−4.9ft	**lb**	***41420**	***41420**	***44930**	**33180**	***33090**	**20610**	***25020**	**14240**			***20990**	**11680**	**(27.6)**
−3.0m	kg	*23530	*23530	*17840	15300	*13390	9450	*9830	6560			*9650	6450	7.58
−9.8ft	**lb**	***51870**	***51870**	***39330**	**33730**	***29520**	**20830**	***21670**	**14460**			***21270**	**14220**	**(24.9)**
−4.5m	kg	*17160	*17160	*13520	*13520	*9940	9850					*9270	9190	6.27
−14.8ft	**lb**	***37830**	***37830**	***29810**	***29810**	***21910**	**21720**					***20440**	**20260**	**(20.6)**

Note 1. Lifting capacity are based on SAE J1097 and ISO 10567.
2. Lifting capacity of the ROBEX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
3. The load point is a hook located on the back of the bucket.
4. *indicates load limited by hydraulic capacity.

5. LIFTING CAPACITIES

(2) 7.06 m (23' 2") boom, 3.38 m (11' 1 ") arm equipped with 2.79 m³ (SAE heaped) bucket and 600 mm (24") double grouser shoe and 10200 kg (22487 lb) counterweight.

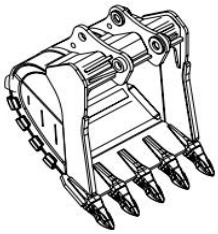
LIFT-POINT HEIGHT (m/ft)		LIFTING-POINT RADIUS										AT MAX. REACH		
		3.0m(9.8ft)		4.5m(14.8ft)		6.0m(19.7ft)		7.5m(24.6ft)		9.0m(29.5ft)		CAPACITY		REACH
														m (ft)
9.0m	kg											*4520	*4520	7.49
29.5ft	**lb**											***9960**	***9960**	**(24.6)**
7.5m	kg							*7670	*7670			*4320	*4320	8.65
24.6ft	**lb**							***16910**	***16910**			***9520**	***9520**	**(28.4)**
6.0m	kg							*8190	*8190	*6770	*6770	*4370	*4370	9.43
19.7ft	**lb**							***18060**	***18060**	***14930**	***14930**	***9630**	***9630**	**(30.9)**
4.5m	kg					*11120	*11120	*9050	*9050	*7790	6690	*4610	*4610	9.92
14.8ft	**lb**					***24520**	***24520**	***19950**	***19950**	***17170**	**14750**	***10160**	***10160**	**(32.5)**
3.0m	kg			*18670	*18670	*12940	*12940	*10030	8970	*8290	6400	*5050	4970	10.16
9.8ft	**lb**			***41160**	***41160**	***28530**	***28530**	***22110**	**19780**	***18280**	**14110**	***11130**	**10960**	**(33.3)**
1.5m	kg			*20950	19120	*14380	12200	*10870	8470	*8740	6120	*5750	4790	10.18
4.9ft	**lb**			***46190**	**42150**	***31700**	**26900**	***23960**	**18670**	***19270**	**13490**	***12680**	**10560**	**(33.4)**
0.0m	kg			*20830	18470	*15060	11650	*11350	8110	*8950	5900	*6840	4870	9.97
0.0ft	lb			***45920**	**40720**	***33200**	**25680**	***25020**	**17880**	***19730**	**13010**	***15080**	**10740**	**(32.7)**
-1.5m	kg	*13550	*13550	*20350	18360	*14880	11400	*11270	7920	*8720	5800	*7930	5250	9.52
-4.9ft	**lb**	***29870**	***29870**	***44860**	**40480**	***32800**	**25130**	***24850**	**17460**	***19220**	**12790**	***17480**	**11570**	**(31.2)**
-3.0m	kg	*19770	*19770	*18390	*18390	*13800	11420	*10460	7910			*8080	6080	8.79
-9.8ft	**lb**	***43590**	***43590**	***40540**	***40540**	***30420**	**25180**	***23060**	**17440**			***17810**	**13400**	**(28.8)**
-4.5m	kg	*19840	*19840	*15230	*15230	*11580	*11580	*8450	8120			*8010	7780	7.71
-14.8ft	lb	***43740**	***43740**	***33580**	***33580**	***25530**	***25530**	***18630**	**17900**			***17660**	**17150**	**(25.3)**
-6.0m	kg			*10110	*10110	*7290	*7290					*7150	*7150	6.06
-19.7ft	lb			***22290**	***22290**	***16070**	***16070**					***15760**	***15760**	**(19.9)**

Note
1. Lifting capacity are based on SAE J1097 and ISO 10567.
2. Lifting capacity of the ROBEX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
3. The load point is a hook (standard equipment) located on the back of the bucket.
4. *indicates load limited by hydraulic capacity.

6.BUCKET SELECTION GUIDE

1) R505LVS

ROCK BUCKET



2.2 m^3 SAE 2.5 m^3 SAE *2.79m^3 SAE 3.0 m^3 SAE

heaped bucket

Capacity		Weight	Recommendation		
			6.55 m (21.6") boom		REMARK
SAE heaped	CECE heaped		2.4 m arm (7' 10")	*2.9 m arm (9' 6")	
2.2m^3 (2.88 yd^3)	1.93m^3 (2.52yd^3)	2528 kg (5573 lb)			OPT
2.5m^3 (3.27 yd^3)	2.16m^3 (2.83 yd^3)	2660 kg (5864 lb)			OPT
*2.79 m^3 (3.65 yd^3)	2.47 m^3 (3.23 yd^3)	2980 kg (6570 lb)			STD
3.0m^3 (3.92 yd^3)	2.76 m^3 (3.61 yd^3)	3100 kg (6834 lb)			OPT

Applicable for materials with density of 2000 kg/m^3 (3370 lb/yd^3) or less

Applicable for materials with density of 1600 kg/m^3 (2700 lb/yd^3) or less

Applicable for materials with density of 1100 kg/m^3 (1850 lb/yd^3) or less

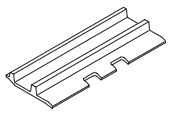
7. UNDERCARRIAGE

1) R505LVS

(1) TRACKS

X-leg type center frame is integrally welded with reinforced box-section track frames. The design includes dry tracks, lubricated rollers, idlers, sprockets, hydraulic track adjusters with shock absorbing springs and assembled track-type tractor shoes with double grousers.

(2) TYPES OF SHOES

Model	Shapes		Double grouser
			
R505LVS	Shoe width	mm (in)	600 (24)
	Link quantity		53
	Ground pressure	kgf/cm^2 (psi)	0.88 (12.53)
	Overall width	mm (ft-in)	3340 (10' 11")

(3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	2 EA
Track rollers	9 EA
Track shoes	53 EA

(4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

Confirm the category from the list of applications in **table 2**, then use **table 1** to select the shoe. Wide shoes (categories B and C) have limitations on applications. Before using wide shoes, check the precautions, then investigate and study the operating conditions to confirm if these shoes are suitable.

Select the narrowest shoe possible to meet the required flotation and ground pressure. Application of wider shoes than recommendations will cause unexpected problem such as bending of shoes, crack of link, breakage of pin, loosening of shoe bolts and the other various problems.

※ **Table 1**

Track shoe	Specification	Category
600 mm double grouser	Standard	A
700 mm triple grouser	Option	B
750 mm triple grouser	Option	B
800 mm triple grouser	Option	C
900 mm triple grouser	Option	C

※ **Table 2**

Category	Applications	Applications
A	Rocky ground, river beds, normal soil	· Travel at low speed on rough ground with large obstacles such as boulders or fallen trees
B	Normal soil, soft ground	· These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles
C	Extremely soft gound (swampy ground)	· Use the shoes only in the conditions that the machine sinks and it is impossible to use the shoes of category A or B · These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Cummins QSM 11
Type	4-cycle turbocharged charger air cooled diesel engine
Cooling method	Water cooling
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	125 × 147.1 mm (4.92" × 5.79")
Piston displacement	10800 cc (659 cu in)
Compression ratio	16.3 : 1
Rated gross horse power (SAE J1995)	407 hp at 1900 rpm (299 kW at 1900 rpm)
Maximum torque	193.6 kgf · m at 1300 rpm
Engine oil quantity	38 ℓ (10 U.S. gal)
Dry weight	942 kg (2077 lb)
Low idling speed	900 ± 50 rpm
High idling speed	1750 ± 50 rpm
Rated fuel consumption	155.4 g/Hp · hr at 1900 rpm
Battery	2 × 12V × 200Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 225 cc/rev
Maximum pressure	330 kgf/cm^2 (4690 psi) [360 kgf/cm^2 (5124 psi)]
Rated oil flow	2 × 405 ℓ /min (107U.S. gpm / 89.1 U.K. gpm)
Rated speed	1800 rpm

[ ]: Power boost

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15 cc/rev
Maximum pressure	40 kgf/cm^2 (570 psi)
Rated oil flow	27 ℓ /min (7.1 U.S. gpm/5.9 U.K. gpm)

4) MAIN CONTROL VALVE

Item		Specification
Type		9 spools
Operating method		Hydraulic pilot system
Main relief valve pressure		330 kgf/cm^2 (4690 psi) [360 kgf/cm^2 (5120 psi)]
Port relief valve pressure	Boom	380 kgf/cm^2 (5405 psi)
	Arm	380 kgf/cm^2 (5405 psi)
	Bucket	380 kgf/cm^2 (5405 psi)

[ ]: Power boost

5) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	142.8 cc/rev
Relief pressure	285 kgf/cm^2 (4050 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	1192 kgf · m (8622 lbf · ft)
Brake release pressure	20.9～35.5 kgf/cm^2 (297～515psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	360 kgf/cm^2 (5120 psi)
Capacity (max / min)	281.7/175.9 cc/rev
Reduction gear type	3-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	15.7kgf/cm^2 (223 psi)
Braking torque	7359 kgf · m (53228 lbf · ft)

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	ø 170 × ø 115 × 1580 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	ø 190 × ø 130 × 1820 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 170 × ø 115 × 1370 mm
	Cushion	Extend only

※ **Discoloration of cylinder rod can occur when the friction reduction additive of lubrication oil spreads on the rod surface.**

※ **Discoloration does not cause any harmful effect on the cylinder performance.**

9. RECOMMENDED OILS

Use only oils listed below. Do not mix different brand oil.
Please use HYUNDAI genuine oil and grease.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C(°F) -50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Engine oil pan	Engine oil	38 (10.0)	★SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	7.0×2 (1.8×2)	★SAE 75W-90
Final drive		12.0×2 (3.2×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil ★2	Tank: 295 (77.9) System: 486 (128.4)	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	621 (164)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and water	50 (13.2)	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

SAE : Society of Automotive Engineers
API : American Petroleum Institute
ISO : International Organization for Standardization
NLGI : National Lubricating Grease Institute
ASTM : American Society of Testing and Material

★ : Cold region
Russia, CIS, Mongolia
★2 Hyundai genuine long life hydraulic oil