

SECTION 1 GENERAL



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## SECTION 1 GENERAL

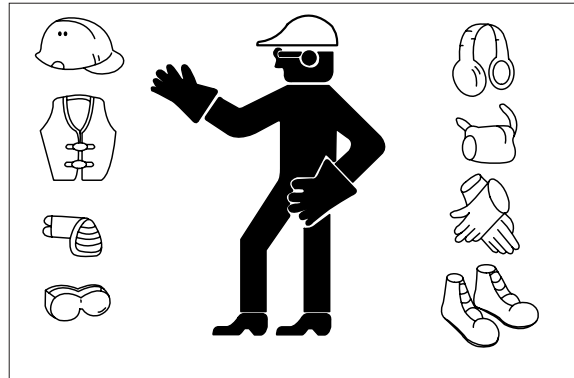
### GROUP 1 SAFETY

#### FOLLOW SAFE PROCEDURE

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

#### WEAR PROTECTIVE CLOTHING

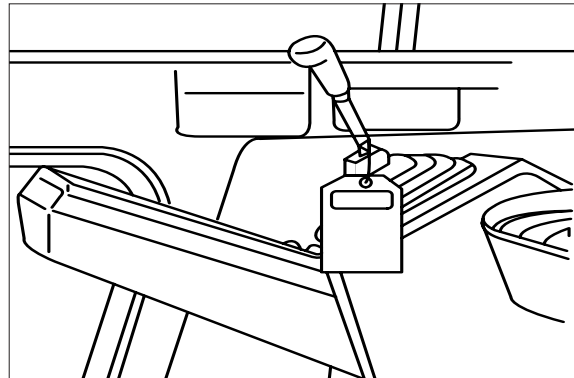
Wear close fitting clothing and safety equipment appropriate to the job.



#### 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.



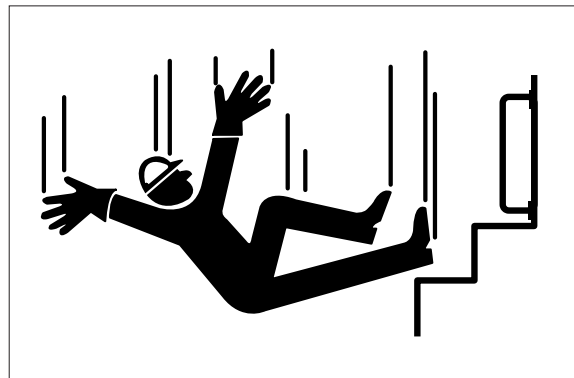
#### USE HANDHOLDS AND STEPS

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.

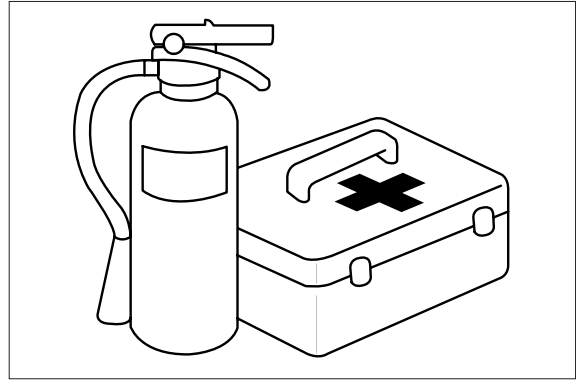


## PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

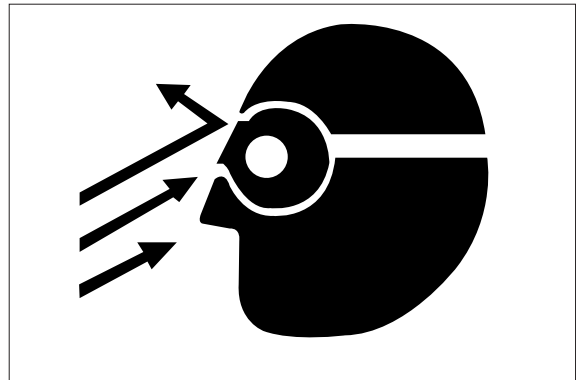
Keep a first aid kit and fire extinguisher handy.

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



## PROTECT AGAINST FLYING DEBRIS

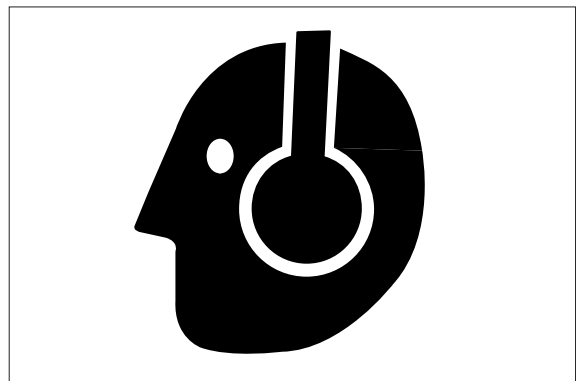
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



## PROTECT AGAINST NOISE

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

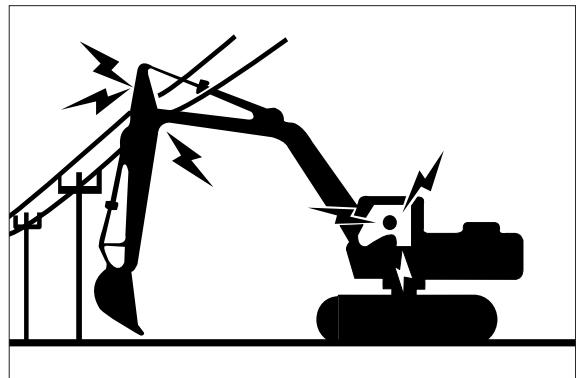
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



## AVOID POWER LINES

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

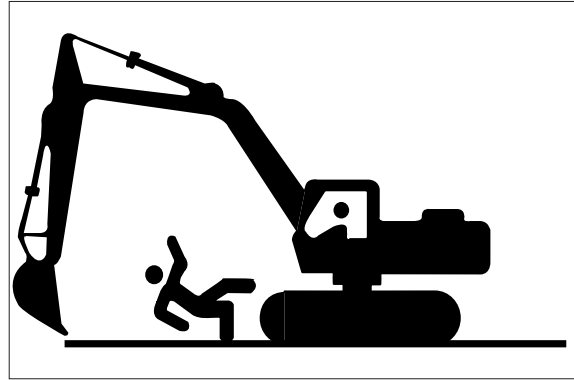
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



## 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.

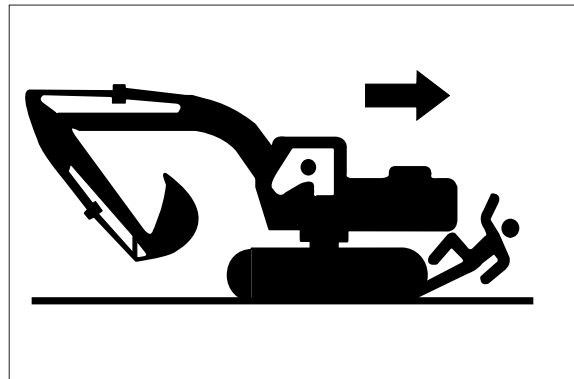


## MOVE AND OPERATE MACHINE SAFELY

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 FROM 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:

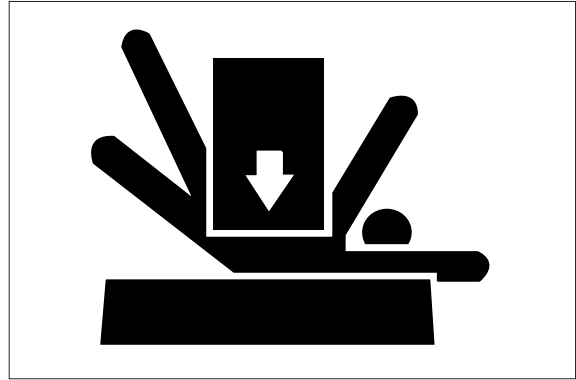
- Park machine on a level surface.
- Lower bucket to the ground.
- Turn auto idle switch off.
- Run engine at 1/2 speed without load for 2 minutes.
- Turn key switch to OFF to stop engine. Remove key from switch.
- Move pilot control shutoff lever to locked position.
- Allow engine to cool.

### **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.

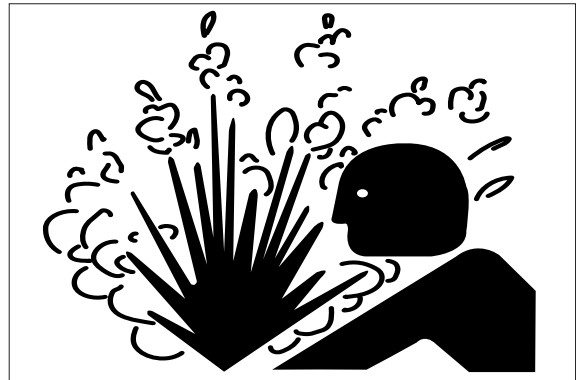
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



### **SERVICE COOLING SYSTEM SAFELY**

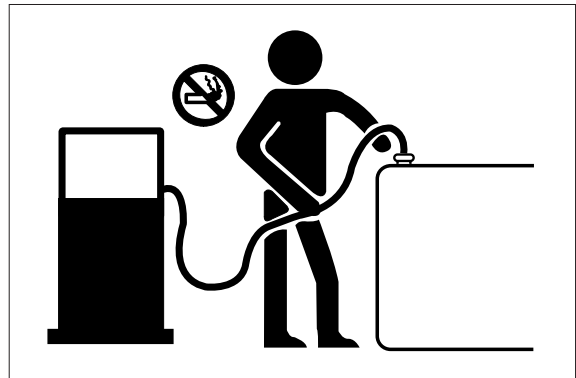
Explosive release of fluids from pressurized cooling system can cause serious burns.

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



### **HANDLE FLUIDS SAFELY-AVOID FIRES**

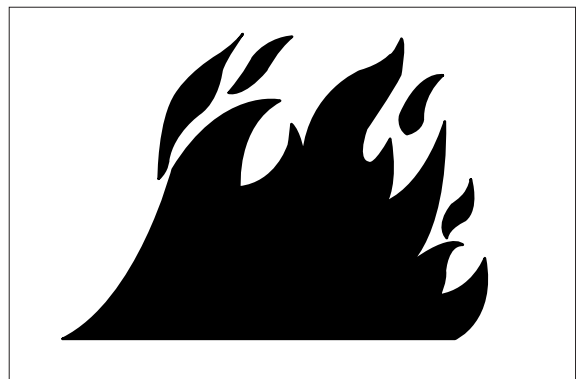
Handle fuel with care; It is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks. Always stop engine before refueling machine. Fill fuel tank outdoors.



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

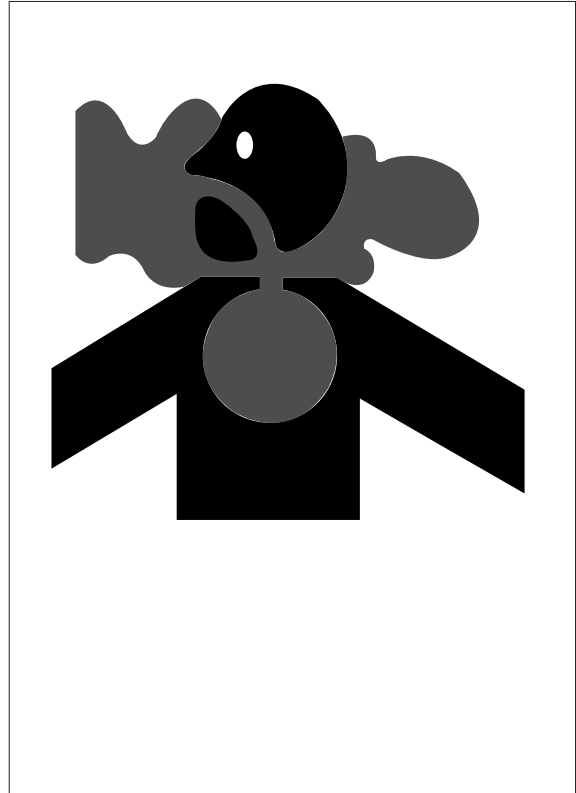
Avoid potentially toxic fumes and dust.

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

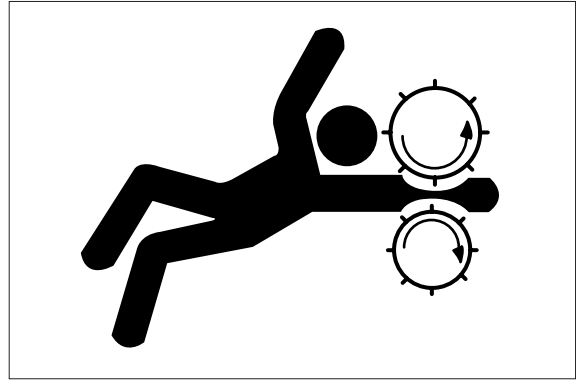
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



## 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.

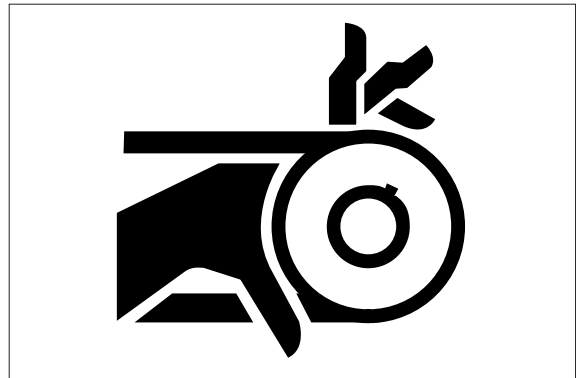
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



## STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

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



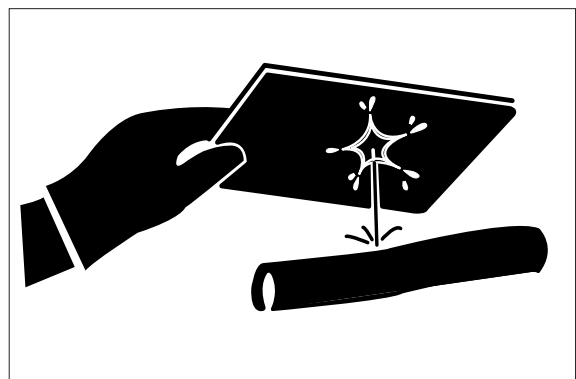
## AVOID HIGH PRESSURE FLUIDS

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.



## **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).





## 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:

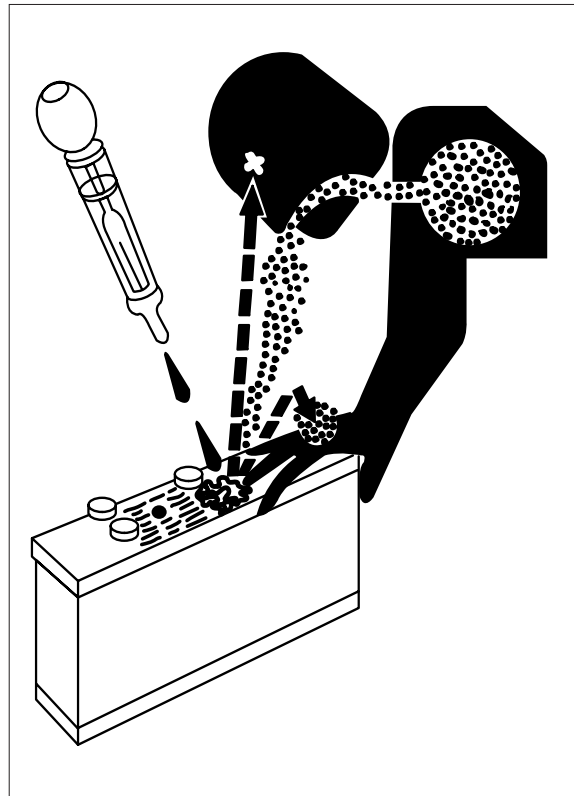
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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.



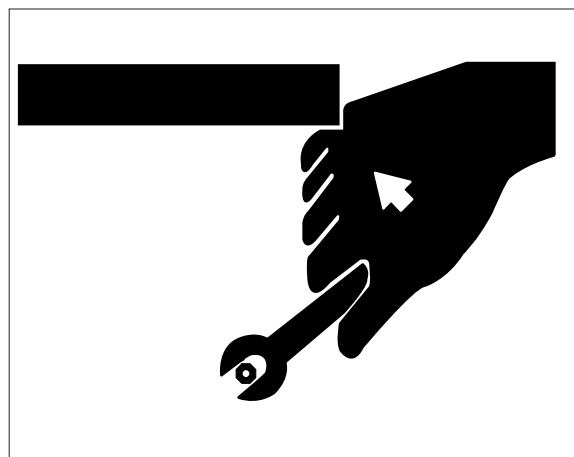
## USE TOOLS PROPERLY

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.)

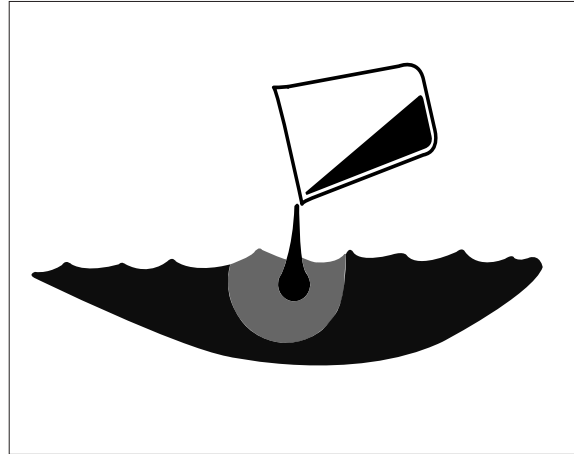


## DISPOSE OF FLUIDS PROPERLY

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.

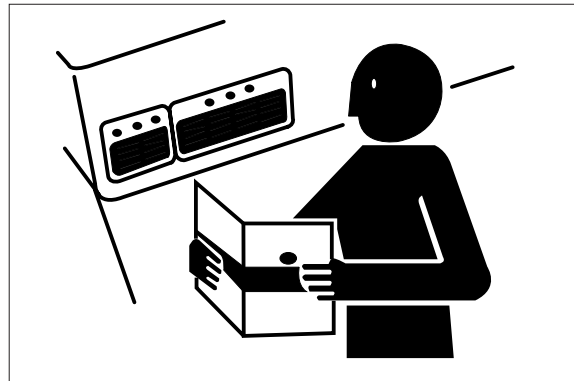
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

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.

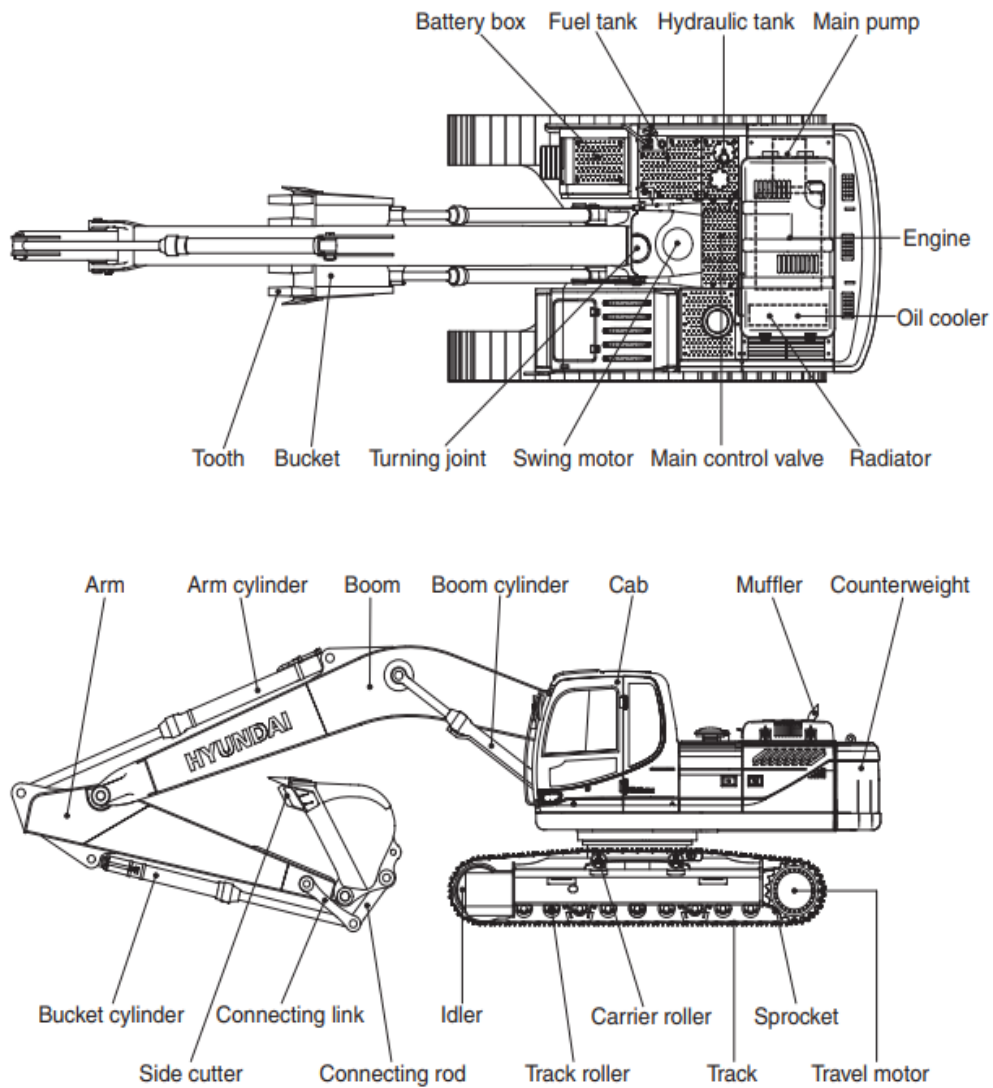


## LIVE WITH SAFETY

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

## GROUP 2 SPECIFICATIONS

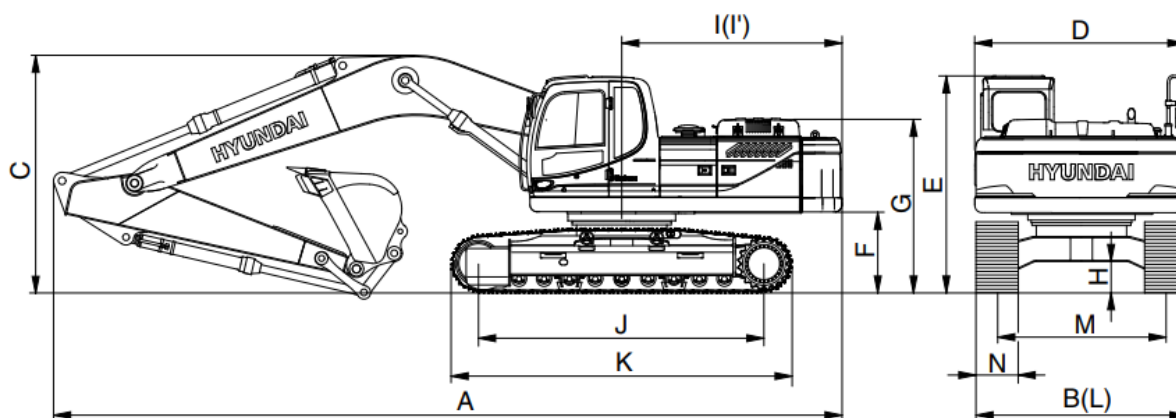
### 1. MAJOR COMPONENT



## 2. SPECIFICATIONS

### 1) R305LVS

·6.25 m (20' 6") BOOM and 2.85 m (9' 4") ARM

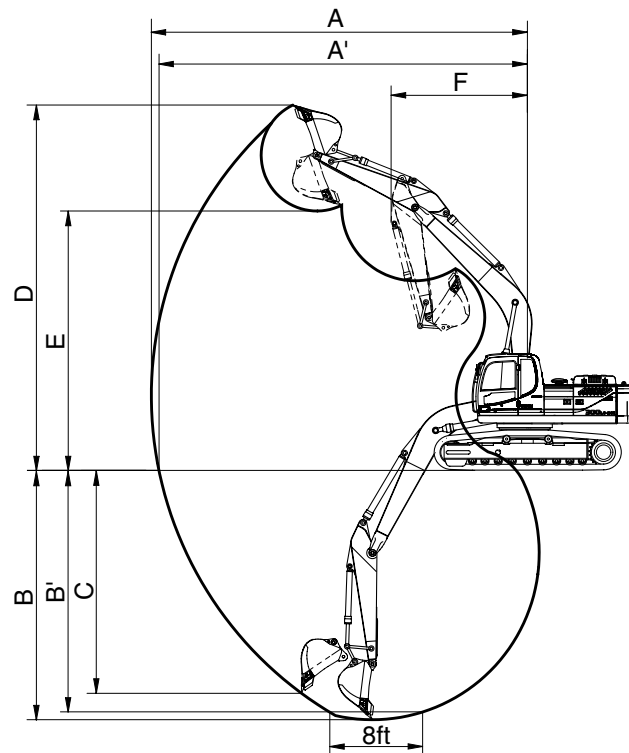


Description		Unit	Specification
Operating weight		kg (lb)	30200 (66580)
Bucket capacity (SAE heaped), standard		m <sup>3</sup> (yd <sup>3</sup> )	1.44(1.88)
Overall length	A	mm (ft-in)	10453(34' 4")
Overall width, with 600mm shoe	B		3200 (10' 6")
Overall height	C		3350 (10' 12")
Superstructure width	D		2980 ( 9' 9")
Overall height of cab	E		3010 ( 9' 11")
Ground clearance of counterweight	F		1190 ( 3' 11")
Engine cover height	G		3190 (10' 6")
Minimum ground clearance	H		500 ( 1' 8")
Rear-end distance	I		3118 (10' 3")
Rear-end swing radius	I'		3196 (10' 5")
Distance between tumblers	J		4030 (13' 3")
Undercarriage length	K		4940 (16' 2")
Undercarriage width	L		3200 (10' 6")
Track gauge	M		2600 ( 8' 6")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.2/5.6 (2.0/3.2)
Swing speed		rpm	10.2
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm <sup>2</sup> (psi)	0.58 (8.25)
Max traction force		kg (lb)	26500 (58422)

### 3. WORKING RANGE

#### 1) R305LVS

·6.25 m (20' 6") BOOM



Description		2.85m (9' 4") Arm	
Max digging reach	A	10590 mm	(34' 9")
Max digging reach on ground	A'	10400 mm	(34' 1")
Max digging depth	B	7180 mm	(23' 7")
Max digging depth (8 ft level)	B'	6990 mm	(22' 11")
Max vertical wall digging depth	C	6120 mm	(20' 1")
Max digging height	D	10030 mm	(32' 11")
Max dumping height	E	7000 mm	(22' 12")
Min swing radius	F	4300 mm	(14' 1")
Bucket digging force	SAE	168.7 [183.2] kN	
		17200 [18670] kgf	
		37920 [41170] lbf	
	ISO	192.2 [208.7] kN	
		19600 [21280] kgf	
		43210 [46910] lbf	
Arm digging force	SAE	139.3 [151.2] kN	
		14200 [15420] kgf	
		31310 [33990] lbf	
	ISO	145.1 [157.5] kN	
		14800 [16070] kgf	
		32630 [35430] lbf	

[ ] : Power boost

## 4. WEIGHT

### 1) R305LVS















Item	R305LVS	
	kg	lb
Upperstructure assembly	12604	27786
Main frame weld assembly	2757	6078
Engine assembly	556	1226
Main pump assembly	140	310
Main control valve assembly	220	485
Swing motor assembly	390	860
Hydraulic oil tank assembly	250	560
Fuel tank assembly	240	530
Counterweight	5200	11464
Cab assembly	490	1080
Lower chassis assembly	10740	23680
Track frame weld assembly	3765	8300
Swing bearing	433	955
Travel motor assembly	400	880
Turning joint	54	120
Track recoil spring	215.5	475
Idler	260	573
Carrier roller	35	80
Track roller	56.4	124.3
Track-chain assembly (600 mm standard triple grouser shoe)	1879	4143
Front attachment assembly (6.25 m boom, 2.85 m arm, 1.44 m³ SAE heaped bucket)	5610	12370
6.25 m boom assembly	2385	5258
2.85 m arm assembly	1099	2423
1.44 m³ SAE heaped bucket	1314	2897
Boom cylinder assembly	270	600
Arm cylinder assembly	360	790
Bucket cylinder assembly	220	485
Bucket control link assembly	110	240

## 5. LIFTING CAPACITIES

### 1) R305LVS

(1) 6.25 m (20' 6") boom, 2.85 m (9' 4") arm equipped with 1.44 m<sup>3</sup> (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 5200 kg (11464 lb) counterweight.

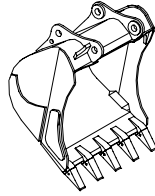
 : Rating over-front
  : Rating over-side or 360 degree

Load point height		Load radius												At max. reach		
		1.5 m (5 ft)		3.0 m (10 ft)		4.5 m (15 ft)		6.0 m (20 ft)		7.5 m (25 ft)		9.0 m (30 ft)		Capacity		Reach
																m (ft)
7.5 m (25 ft)	kg lb													*4630 *10210	*3720 *8200	8.71 (28.6)
6.0 m (20 ft)	kg lb									*5180 *11420	*4830 *10650			*4780 *10540	2980 6570	9.53 (31.3)
4.5 m (15 ft)	kg lb							*6310 *13910	*6310 *13910	*5650 *12460	4620 10190			*4490 *9900	2570 5670	10.01 (32.8)
3.0 m (10 ft)	kg lb					*10520 *23190	*10200 *22490	*7670 *16910	6390 14090	*6360 *14020	4340 9570	*3820 *8420	3040 6700	*4220 *9300	2370 5220	10.21 (33.5)
1.5 m (5 ft)	kg lb					*12940 *28530	*9200 *20280	*8990 *19820	5880 12960	*7020 *15480	4070 8970	*4560 *10050	2900 6390	4180 9220	2320 5110	10.16 (33.3)
Ground Line	kg lb			*10120 *22310	*10210 *22310	*14190 *31280	*8730 *19250	*9820 *21650	5540 12210	*6790 *14970	3860 8510			4380 9660	2430 5360	9.84 (32.3)
-1.5 m (-5 ft)	kg lb	*11650 *25680	*11650 *25680	*14830 *32690	*14830 *32690	*14410 *31770	*8600 *18960	*9650 *21270	5390 11880	6680 14730	3760 8290			4900 10800	2760 6080	9.22 (30.2)
-3.0 m (-10 ft)	kg lb	*15860 *34970	*15860 *34970	*20180 *44490	*20180 *44490	*13780 *30380	*8700 *19180	*9670 *21320	5410 11930	6730 14840	3810 8400			6010 13250	3460 7630	8.23 (27.0)
-4.5 m (-15 ft)	kg lb			*17240 *38010	*17240 *38010	*12070 *26610	*9020 *19890	*8740 *19270	*5640 *12430							

- 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. \*A device to prevent the boom from falling must be installed.

## 6. BUCKET SELECTION GUIDE

### 1) ROCK BUCKET



1.44 m<sup>3</sup> SAE  
heaped bucket

Capacity		Width		Weight	Recommendation
SAE heaped	CECE heaped	Without side cutter	With side cutter		6.25 m (20' 6") boom
					2.85 m arm (9' 4")
1.44 m³ (1.88 yd³)	1.26 m³ (1.65 yd³)	1480 mm (58.3")	-	1310 kg (2890 lb)	Applicable for materials with density of 1600 kg/m³ (2700 lbf/yd³) or less

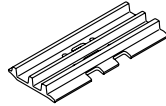


## 7. UNDERCARRIAGE

### 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 triple grousers.

### 2) TYPES OF SHOES

Model	Shapes		Triple grouser
			
R305LVS	Shoe width	mm (in)	600 (24)
	Operating weight	kg (lb)	30200 (66580)
	Ground pressure	kgf/cm <sup>2</sup> (psi)	0.58 (8.25)
	Overall width	mm (ft-in)	3200 (10' 6")

### 3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	2 EA
Track rollers	9 EA
Track shoes	48 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
600mm triple grouser	Standard	A

※ Table 2

Category	Applications	Precautions
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 ground (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	HYUNDAI HE 6.7
Type	4-cycle turbocharged 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	107 × 124 mm (4.21" × 4.88")
Piston displacement	6700 cc (409cu in)
Compression ratio	17.2 : 1
Rated gross horse power (SAE J1995)	227 Hp at 1900 rpm (169 kW at 1900 rpm)
Maximum torque	97.0 kgf·m (701 lbf·ft) at 1400 rpm
Engine oil quantity	24 ℓ (6.3 U.S. gal)
Dry weight	556 kg (1226 lb)
High idling speed	1850 ± 50 rpm
Low idling speed	800 ± 100 rpm
Rated fuel consumption	166.3 g/Hp·hr at 1900 rpm
Starting motor	24 V-4.5 kW
Alternator	24 V-90 A
Battery	2 × 12 V × 160 Ah

### 2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 140 cc/rev
Maximum pressure	350 kgf/cm <sup>2</sup> (4980 psi) [380 kgf/cm <sup>2</sup> (5400 psi)]
Rated oil flow	2 × 252ℓ/min (66.6 U.S. gpm / 55.4 U.K. gpm)

[ ] : Power boost

### 3) GEAR PUMP

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

### 4) MAIN CONTROL VALVE

Item		Specification
		R305LVS
Type		10 spools
Operating method		Hydraulic pilot system
Main relief valve pressure		350 kgf/cm <sup>2</sup> (4980 psi) [380 kgf/cm <sup>2</sup> (5400 psi)]
Port relief valve pressure	Boom	400 kgf/cm <sup>2</sup> (5690 psi)
	Arm	400 kgf/cm <sup>2</sup> (5690 psi)
	Bucket	400 kgf/cm <sup>2</sup> (5690 psi)

[ ]: Power boost

### 5) SWING MOTOR

Item	Specification
Type	Axial piston motor
Capacity	156.9 cc/rev
Relief pressure	300 kgf/cm <sup>2</sup> (4270 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	84.4kgf·m (613 lbf·ft)
Brake release pressure	22.3~36.6 kgf/cm <sup>2</sup> (427~711 psi)
Reduction gear type	2 - stage planetary

### 6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	350 kgf/cm <sup>2</sup> (4980 psi)
Capacity	154.8/88.5 cc/rev
Reduction gear type	3-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	9 kgf/cm <sup>2</sup> (128 psi)
Braking torque	40 kgf·m (290 lbf·ft)

## 7)CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	Ø140× Ø100× 1465 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	Ø150× Ø110× 1765 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	Ø135× Ø95× 1185 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.

## 8)SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R305LVS	Standard	600 mm (24")	0.58 kgf/cm <sup>2</sup> (8.25 psi)	48	3200 mm ( 10' 6")

## 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℃(F)								
			-50 (-58)	-30 (-22)	-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Engine oil pan	Engine oil	24 (6.3)	★SAE 5W-40								
			SAE 10W-30								
			SAE 15W-40								
Swing drive	Gear oil	6.0 (1.6)	★SAE 75W-90								
Final drive		7.8×2 (2.1×2)	SAE 80W-90								
Hydraulic tank	Hydraulic oil	Tank; 190 (50)	★ISO VG 15								
			ISO VG 32								
		System; 330 (87)	ISO VG 46								
			ISO VG 68								
Fuel tank	Diesel fuel	560 (148)	★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 : 50	50 (13.2)	Ethylene glycol base permanent type								
			★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