

Product: New Holland TL60E/TL75E/TL85E/TL95E Tractor Service Repair Manual

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# SERVICE MANUAL

## TL60E / TL75E / TL85E / TL95E Tractor

Part number 47835583

English  
October 2015



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## SERVICE MANUAL

**TL60E 12x4, 4WD, new cab [HCCZTL60CFC438464 - ], TL60E Without cab, 12x4, 4WD [ZDCL05524 - ], TL75E 12x4, 2WD, new cab [HCCZTL75CFC438464 - ], TL75E Without cab, 2WD, 12x4 [ZDCY12367 - ], TL75E 12x12, 20x12, 4WD, new cab [HCCZTL75CFC437744 - ], TL85E Without cab, 4WD [ZDCL04468 - ], TL85E Without cab, 2WD [ZEC134399 - ], TL85E 12x4, 12x12, 2WD, new cab [HCCZTL85CFC437744 - ], TL85E 12x12, 20x12, 4WD, new cab [HCCZTL75CFC438464 - ], TL95E Without cab, 4WD [ZDC112512 - ], TL95E 12x12, 20x12, 4WD, new cab [HCCZTL95EFC438464 - ]**

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# Link Product / Engine

Product	Market Product	Engine
TL60E 12x4, 4WD, cabine nova [HCCZTL60CFC438464 - ]	Australia New Zealand	8035.05.716
TL60E 12x4, 4WD, cabine nova [HCCZTL60CFC438464 - ]	Latin America	8035.05.716
TL60E 12x4, 4WD, cabine nova [HCCZTL60CFC438464 - ]	Asia Pacific	8035.05.716
TL60E 12x4, 4WD, cabine nova [HCCZTL60CFC438464 - ]	Middle East Africa	8035.05.716
TL60E 12x4, 4WD, cabine nova [HCCZTL60CFC438464 - ]	North America	8035.05.716
TL60E 12x4, 4WD, cabine nova [HCCZTL60CFC438464 - ]	Europe	8035.05.716
TL60E Sem cabine, 12x4, 4WD [ZDCL05524 - ]	Asia Pacific	8035.05.716
TL60E Sem cabine, 12x4, 4WD [ZDCL05524 - ]	Middle East Africa	8035.05.716
TL60E Sem cabine, 12x4, 4WD [ZDCL05524 - ]	Australia New Zealand	8035.05.716
TL60E Sem cabine, 12x4, 4WD [ZDCL05524 - ]	Latin America	8035.05.716
TL60E Sem cabine, 12x4, 4WD [ZDCL05524 - ]	North America	8035.05.716
TL60E Sem cabine, 12x4, 4WD [ZDCL05524 - ]	Europe	8035.05.716
TL75E 12x4, 2WD, cabine nova [HCCZTL75CFC438464 - ]	Asia Pacific	8045.05.260
TL75E 12x4, 2WD, cabine nova [HCCZTL75CFC438464 - ]	Latin America	8045.05.260
TL75E 12x4, 2WD, cabine nova [HCCZTL75CFC438464 - ]	Australia New Zealand	8045.05.260
TL75E 12x4, 2WD, cabine nova [HCCZTL75CFC438464 - ]	Middle East Africa	8045.05.260
TL75E 12x4, 2WD, cabine nova [HCCZTL75CFC438464 - ]	Europe	8045.05.260
TL75E 12x4, 2WD, cabine nova [HCCZTL75CFC438464 - ]	North America	8045.05.260
TL75E 12x12, 20x12, 4WD, cabine nova [HCCZTL75CFC437744 - ]	Middle East Africa	8045.05.260
TL75E 12x12, 20x12, 4WD, cabine nova [HCCZTL75CFC437744 - ]	Latin America	8045.05.260
TL75E 12x12, 20x12, 4WD, cabine nova [HCCZTL75CFC437744 - ]	Europe	8045.05.260
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TL75E 12x12, 20x12, 4WD, cabine nova [HCCZTL75CFC437744 - ]	Australia New Zealand	8045.05.260
TL75E 12x12, 20x12, 4WD, cabine nova [HCCZTL75CFC437744 - ]	North America	8045.05.260

Product	Market Product	Engine
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TL85E Sem cabine, 4WD [ZDCL04468 - ]	Europe	8045.25.260
TL85E Sem cabine, 4WD [ZDCL04468 - ]	Australia New Zealand	8045.25.260
TL85E Sem cabine, 4WD [ZDCL04468 - ]	Asia Pacific	8045.25.260
TL85E Sem cabine, 4WD [ZDCL04468 - ]	North America	8045.25.260
TL85E Sem cabine, 4WD [ZDCL04468 - ]	Middle East Africa	8045.25.260
TL85E Sem cabine, 2WD [ZEC134399 - ]	North America	8045.25.260
TL85E Sem cabine, 2WD [ZEC134399 - ]	Asia Pacific	8045.25.260
TL85E Sem cabine, 2WD [ZEC134399 - ]	Australia New Zealand	8045.25.260
TL85E Sem cabine, 2WD [ZEC134399 - ]	Latin America	8045.25.260
TL85E Sem cabine, 2WD [ZEC134399 - ]	Middle East Africa	8045.25.260
TL85E Sem cabine, 2WD [ZEC134399 - ]	Europe	8045.25.260
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TL85E 12x4, 12x12, 2WD, cabine nova [HCCZTL85CFC437744 - ]	North America	8045.25.260
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TL85E 12x12, 20x12, 4WD, cabine nova [HCCZTL75CFC438464 - ]	Europe	8045.25.260
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TL85E 12x12, 20x12, 4WD, cabine nova [HCCZTL75CFC438464 - ]	Middle East Africa	8045.25.260
TL95E Sem cabine, 4WD [ZDC112512 - ]	Asia Pacific	8045.25.262
TL95E Sem cabine, 4WD [ZDC112512 - ]	Europe	8045.25.262

Product	Market Product	Engine
TL95E Sem cabine, 4WD [ZDC112512 - ]	North America	8045.25.262
TL95E Sem cabine, 4WD [ZDC112512 - ]	Latin America	8045.25.262
TL95E Sem cabine, 4WD [ZDC112512 - ]	Middle East Africa	8045.25.262
TL95E Sem cabine, 4WD [ZDC112512 - ]	Australia New Zealand	8045.25.262
TL95E 12x12, 20x12, 4WD, cabine nova [HCCZTL95EFC438464 - ]	Europe	8045.25.262
TL95E 12x12, 20x12, 4WD, cabine nova [HCCZTL95EFC438464 - ]	Australia New Zealand	8045.25.262
TL95E 12x12, 20x12, 4WD, cabine nova [HCCZTL95EFC438464 - ]	Middle East Africa	8045.25.262
TL95E 12x12, 20x12, 4WD, cabine nova [HCCZTL95EFC438464 - ]	Asia Pacific	8045.25.262
TL95E 12x12, 20x12, 4WD, cabine nova [HCCZTL95EFC438464 - ]	North America	8045.25.262
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## INTRODUCTION

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(\*) See content for specific models

## International symbols

TL60E	
TL75E	
TL85E	
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As a guide to the operation of the machine, various universal symbols have been utilized on the instruments, controls, switches, and fuse box. The symbols are shown below with an indication of their meaning.

	Heater plug for cold start		Turning signal		Power Take-Off (PTO)		Reaction control
	Alternator charging		Activated memory		Transmission in neutral		Accessories socket
	Fuel level		Turn signals		Creeper selection		Implement socket
	Automatic fuel shut-off		Turn signals - one trailer		Low speed selection		Percentage slip
	Engine speed (rpm x 100)		Turn signals - two trailers		High speed selection		Raising of the hydraulic lift
	Hour meter		Wind shield washer		Road speed		Rear hitch lower
	Engine oil pressure		Windscreen wash wipe		Differential Lock		Hydraulic lift height threshold
	Engine coolant temperature		Heating temperature control		Rear axle oil temperature		Hydraulic lift disabled
	Coolant level		Cab recirculation fan		Transmission oil pressure		Transmission filters and hydraulic filters
	Machine lights		Air conditioner		Auxiliary Front Wheel Drive (AFWD) operated		Remote control valve extension
	Main beam head		Air Filter Restriction		Warning!		Remote control valve command retraction
	Low beam		Parking brake		Danger warning lights		Remote control valve flotation
	Work lamps		Brake fluid level		Variable control		Malfunction! See Operator's
	Stop lamp		Trailer brake		Pressurized! Open carefully		Malfunction! (alternative symbol)
	Klaxon		Warning! Corrosive substance		Position control		Brake fluid level

## **Foreword - Important notice regarding equipment servicing**

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

In case of questions, refer to your NEW HOLLAND Sales and Service Networks.

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## Foreword - How to use and navigate through this manual

This manual has been produced by a new technical information system. This new system is designed to deliver technical information electronically through web delivery (eTIM), DVD, and paper manuals. A coding system called SAP has been developed to link the technical information to other Product Support functions, e.g., Warranty.

Technical information is written to support the maintenance and service of the functions or systems on a customer's machine. When a customer has a concern on their machine it is usually because a function or system on their machine is not working at all, is not working efficiently, or is not responding correctly to their commands. When you refer to the technical information in this manual to resolve that customer's concern, you will find all the information classified using the SAP coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system, you will then find all the mechanical, electrical or hydraulic devices, components, assemblies, and sub assemblies for that function or system. You will also find all the types of information that have been written for that function or system: the technical data (specifications), the functional data (how it works), the diagnostic data (fault codes and troubleshooting), and the service data (remove, install adjust, etc.).

By integrating SAP coding into technical information, you will be able to search and retrieve just the right piece of technical information you need to resolve that customer's concern on his machine. This is made possible by attaching 3 categories to each piece of technical information during the authoring process.

The first category is the Location, the second category is the Information Type and the third category is the Product:

- LOCATION - the component or function on the machine, that the piece of technical information is going to describe (e.g., Fuel tank).
- INFORMATION TYPE - the piece of technical information that has been written for a particular component or function on the machine (e.g., Capacity would be a type of Technical Data describing the amount of fuel held by the fuel tank).
- PRODUCT - the model for which the piece of technical information is written.

Every piece of technical information will have those three categories attached to it. You will be able to use any combination of those categories to find the right piece of technical information you need to resolve that customer's concern on their machine.

That information could be:

- the procedure for how to remove the cylinder head
- a table of specifications for a hydraulic pump
- a fault code
- a troubleshooting table
- a special tool

## Manual content

This manual is divided into Sections. Each Section is then divided into Chapters. Contents pages are included at the beginning of the manual, then inside every Section and inside every Chapter. An alphabetical Index is included at the end of each Chapter. Page number references are included for every piece of technical information listed in the Chapter Contents or Chapter Index.

Each Chapter is divided into four Information types:

- Technical Data (specifications) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Functional Data (how it works) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Diagnostic Data (fault codes, electrical and hydraulic troubleshooting) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Service Data (remove disassemble, assemble, install) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.

## Sections

Sections are grouped according to the main functions or a systems on the machine. Each Section is identified by a number (00, 35, 55, etc.). The Sections included in the manual will depend on the type and function of the machine that the manual is written for. Each Section has a Contents page listed in alphabetic/numeric order. This table illustrates which Sections could be included in a manual for a particular product.

SECTION	PRODUCT				
	Tractors				
	Vehicles with working arms: backhoes, excavators, skid steers, ....				
	Combines, forage harvesters, balers, ....				
	Seeding, planting, floating, spraying equipment, ....				
	Mounted equipment and tools, ....				
00 - Maintenance	X	X	X	X	X
05 - Machine completion and equipment	X	X	X	X	X
10 - Engine	X	X	X	X	
14 - Main gearbox and drive	X	X	X	X	
18 - Clutch	X	X	X		
21 - Transmission	X	X	X	X	
23 - Four wheel drive (4WD) system	X	X	X	X	
25 - Front axle system	X	X	X	X	
27 - Rear axle system	X	X	X	X	
29 - Hydrostatic drive	X	X	X	X	
31 - Power Take-Off (PTO)	X		X		
33 - Brakes and controls	X	X	X	X	
35 - Hydraulic systems	X	X	X	X	
36 - Pneumatic system	X	X	X	X	
37 - Hitches, drawbars and implement couplings	X		X	X	
39 - Frames and ballasting	X	X	X	X	X
41 - Steering	X	X	X	X	
44 - Wheels	X	X	X	X	
46 - Steering clutches					
48 - Tracks and track suspension	X	X	X		
50 - Cab climate control	X	X	X	X	
55 - Electrical systems	X	X	X	X	X
56 - Grape harvester shaking					
58 - Attachments/headers				X	
60 - Product feeding			X		

## INTRODUCTION

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61 - Metering system			X	
62 - Pressing - Bale formation			X	
63 - Chemical applicators			X	
64 - Chopping			X	
66 - Threshing			X	
68 - Tying/Wrapping/Twisting			X	
69 - Bale wagons				
70 - Ejection			X	
71 - Lubrication system	X	X	X	X
72 - Separation			X	
73 - Residue handling			X	
74 - Cleaning			X	
75 - Soil preparation/Finishing				
76 - Secondary cleaning / Destemmer				
77 - Seeding			X	
78 - Spraying			X	
79 - Planting			X	
80 - Crop storage / Unloading			X	
82 - Front loader and bucket	X	X		
83 - Telescopic single arm	X	X		
84 - Booms, dippers and buckets	X	X		
86 - Dozer blade and arm	X	X		
88 - Accessories	X	X	X	X
89 - Tools	X	X	X	X
90 - Platform, cab, bodywork and decals	X	X	X	X

---

## Chapters

Each Chapter is identified by a number e.g. Engine - Engine and crankcase - 10.001. The first number is identical to the Section number i.e. Chapter 10.001 is inside Section 10, Engine. The second number is representative of the Chapter contained within the Section.

### CONTENTS

The Chapter Contents lists all the technical data (specifications), functional data (how it works), diagnostic data (fault codes and troubleshooting), and service data (remove, install, adjust, etc.), that have been written in that Chapter for that function or system on the machine.

### Contents

ENGINE	
ENGINE - Engine and crankcase – 10.001	

#### TECHNICAL DATA

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#### FUNCTIONAL DATA

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#### SERVICE

ENGINE - Engine and crankcase - Remove (10.001 - F.10.A.10)	8
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ENGINE - Engine and crankcase - Troubleshooting (10.001 - G.40.A.10)	10
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ENGINE - Engine and crankcase - Dynamic description (10.001 - C.30.A.10)	6
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ENGINE - Engine and crankcase - General specification (10.001 - D.40.A.10)	4
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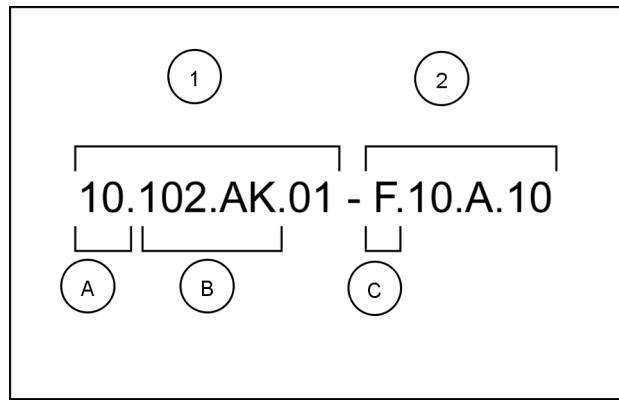
ENGINE - Engine and crankcase - Remove (10.001 - F.10.A.10)	8
---	---

ENGINE - Engine and crankcase - Troubleshooting (10.001 - G.40.A.10)	10
--	----

## Information units and information search

Each chapter is composed of information units. Each information unit has the SAP code shown in parentheses. This indicates the function and type of information in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

Example information unit	Engine block cover - Front – Remove (10.102.AP.01 - F.10.A.10)				
Information Unit SAP code	10	102	AK	01	F 10.A.10
SAP code classification	Engine	Pan and covers	Engine block cover	Service data	Remove



NHIL12GEN0070A 1

Navigate to the correct information unit you are searching for by identifying the function and information type from the SAP code.

- **(1)** Location and **(2)** Information type.
- **(A)** corresponds to the sections of the service manual.  
**(B)** corresponds to the chapters of the service manual. After **(B)** there may be some additional information. In this case it shows ".01", which represents the "Front" block cover. These options may be front/rear, left/right, hydraulic/mechanical etc.  
**(C)** corresponds to the type of information listed in the chapter contents: Technical Data, Functional Data, Diagnostic, or Service.  
**(A)** and **(B)** are also shown in the page numbering on the page footer.
- THE REST OF THE CODING IS NOT LISTED IN ALPHANUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.  
You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

## Page header and footer

The page header will contain the following references:

- Section and Chapter description

The page footer will contain the following references:

- Publication number for that Manual.
- Version reference for that publication.
- Publication date
- Section, chapter, and page reference e.g. 10.102 / 9

---

## Safety rules

### General safety regulations

#### General Aspects

- Strictly follow repair and maintenance procedures.
- Do not wear rings, wrist watches, jewelry, accessories, unbuttoned items of clothing, unsecured clothing like ties, torn clothing, scarves, or open jackets or shirts with open zippers that could get caught in moving parts. Use approved safety clothing, such as anti-slip footwear, sleeves, protective goggles, helmets, etc.
- Wear safety goggles with side shields when cleaning parts using compressed air.
- Worn or damaged cables and chains are not reliable. Do not use these elements in lifting or towing operations.
- Use regulation safety equipment, such as approved eye protection, helmets, clothes, sleeves, and special footwear whenever you are welding. All individuals near the welding process must use regulation eye protection. Never look at the welding arc without using suitable eye protection.
- Never perform any repairs on the machine if there is someone in the operator seat, except when the person is a qualified operator who is helping with the service to be performed.
- Never operate the machine or use accessories from a place other than the operator seat or next to the machine when operating the fender switches.
- Never perform any operations on the machine with the engine running, except when specifically instructed to do so. Shut down the engine and release all the pressure from the hydraulic circuits before removing covers, cases, valves, etc.
- You must conduct all repair and maintenance operations with the utmost care and attention.
- Disconnect the batteries and put warning labels on all of the controls to warn that the machine is being repaired. Lock the machine and all the equipment that you remove.
- Never check or fill the fuel tank or batteries or use starting fluid when you are smoking or near a naked flame, because these fluids are flammable.
- The fuel filling gun must remain in contact with the filler neck. Maintain the contact until the fuel stops flowing into the tank in order to avoid sparks caused by static electricity build-up.
- To transport a faulty machine, use a trailer or a low loader platform trolley, if available.
- To load and unload the machine from the mode of transportation, choose a flat area that offers firm support for the wheels of the truck or trailer. Securely fasten the machine to the platform of the trailer or truck, in accordance with the transporter's requirements.
- Always use hoist mechanisms with an appropriate capacity for lifting or moving heavy components.
- Chains must always be securely fastened. The fastening device must have sufficient capacity to support the intended load. It is prohibited for bystanders to be near the fastening position.
- The work area must always be clean and dry. Clean it immediately if any water or oil is spilled.
- Never use gasoline, diesel, or other flammable liquids for cleaning. Use only non-toxic solvents.
- Do not allow cloths soaked with oil or grease to accumulate because they can cause a fire risk. Always keep these cloths in a metal container.

### Starting

- Never start the engine in enclosed spaces that are not equipped with a suitable exhaust system or gas-extraction system.
- Never bring your head, body, arms, legs, feet, hands, or fingers close to fans or rotating belts.

### Engine

- Always loosen the radiator cap slowly before removing it, in order to dissipate the system pressure. You must top up the coolant with the engine stopped.
- Do not fill up the fuel tank when the engine is running.
- Never adjust the fuel injection pump when the machine is in motion.

- Never lubricate the machine when the engine is running.

### **Electrical systems**

- If it is necessary to use auxiliary batteries, you must connect the cables on both sides as follows: (+) to (+) and (-) to (-). Avoid causing the terminals to short circuit. The gas that the batteries release is highly flammable. During charging, leave the battery compartment open to improve ventilation. Avoid sparks and naked flames near the battery. Do not smoke.
- Do not charge the batteries in enclosed spaces.
- Always disconnect the batteries before carrying out any type of servicing on the electrical system.

### **Hydraulic system**

- A little fluid coming out of a small bore could be almost invisible, but strong enough to penetrate the skin. For this reason, never use your hands to check for leaks. Instead, use a piece of cardboard or wood. If any fluid penetrates your skin, seek medical assistance immediately. Failure to seek immediate medical assistance could result in serious infections or dermatitis.
- Always read the system pressure using suitable gauges.

### **Wheels and tires**

- Make sure that the tires are correctly inflated at the pressure specified by the manufacturer. Inspect the rims and tires regularly for any damage.
- Remain next to the tire when filling it with air.
- Only check the pressure when the platform is unloaded and the tires are cold, in order to prevent inaccurate readings caused by overpressure.
- Never cut or weld a rim with a full tire fitted.
- To remove the wheels, lock both the front and rear wheels of the machine. Lift the machine. Install stable and secure supports under the machine, as per the legislation in force.
- Deflate the tire before removing any objects that may be caught in the tire tread.
- Never inflate tires using flammable gases, as they could cause explosions and injure bystanders.

### **Remove and install**

- Lift and handle all heavy components using hoist devices of appropriate capacity. You must suspend the parts using suitable hooks and slings. Use the hoist eyes provided for this purpose. Be careful if there are any bystanders near the hoisted load.

## Safety rules

### Health and safety precautions

Many of the procedures involved in machine maintenance and repair services involve physical hazards and other health risks. This section lists some of these hazardous procedures and the materials and equipment associated with them.

### Acids and alkalis

Avoid splashing into your eyes and nose, or onto your skin and clothing. Wear suitable sleeves and protective goggles. Irritate and corrode the skin, eyes, nose, and throat. Causes burns. Do not inhale the fumes.

### Adhesives and sealants

These are highly flammable. You must store them in no smoking areas. Use applicators when possible or secondary containers. The containers must be labeled.

### Resin-based adhesives/sealants

Skin contact could result in irritation, dermatitis, and the absorption of toxic or harmful chemicals through the skin. Splashes could cause eye injuries. Ensure that there is adequate ventilation and avoid contact with the skin and the eyes. Follow the manufacturer's instructions.

Ensure that there is adequate ventilation as volatile harmful or toxic chemicals may be released.

### Anti-freeze

These are highly flammable. You must store them in no smoking areas.

Anti-freeze can be absorbed through the skin in toxic or harmful quantities. Ingesting anti-freeze can cause death and you must seek medical assistance immediately.

### Chemicals – General

You must always take care when using and handling chemicals such as solvents, sealants, adhesives, paints, foam resins, battery acids, anti-freeze, brake fluid, oils and greases. They may be harmful, toxic, corrosive, irritant, or highly flammable. They may also emit hazardous fumes or dust.

#### Do

Remove chemicals from skin and clothing as soon as possible after contact. Change very dirty clothes and make provision for cleaning them.

Read and strictly adhere to the safety recommendations on the chemical containers.

When working with chemicals, wash before breaks, and before eating, smoking, drinking, or using the bathroom. Keep work areas clean, organized, and free of spillages. Store according to local and national legislation. Keep chemicals out of the reach of children.

#### Do not

Do not mix chemicals, except in accordance with the manufacturer's instructions. Some substances could form other chemical substances that are toxic or harmful, emit toxic or harmful fumes, or become explosive after mixing. Do not spray chemicals, especially solvent-based chemicals, in enclosed spaces.

Do not apply heat or flames to chemicals, except in accordance with the manufacturer's instructions. Some are highly flammable or could release toxic or harmful fumes.

Do not leave containers open. The fumes emitted could accumulate in toxic, harmful, or explosive concentrations. Some fumes are heavier than air and will accumulate in confined areas, trenches, etc. Do not put chemicals in unmarked containers.

Do not clean your hands or clothes with chemicals. Chemicals, particularly solvents and fuels, dry out the skin and can cause irritation and dermatitis. Some can be absorbed through the skin in toxic or harmful quantities.

Do not use empty containers to store other chemicals, except when they have been cleaned under supervision. Do not attempt to sniff or inhale chemicals. Rapid exposure to high concentrations of fumes can be toxic or harmful.

### **Anti-corrosive protective material**

These materials are varied and you must follow the manufacturers' instructions. They may contain solvents, resins, petroleum derivatives, etc. You must avoid contact with the skin and the eyes. You must carry out spraying with adequate ventilation and never in enclosed spaces.

### **Post**

Dust, powders, or clouds may be irritant, harmful, or toxic. Avoid inhaling the chemical powders or dusts that result from dry abrasion services. Use respiratory protection if ventilation is not adequate.

### **Electric shock**

Electric shocks result from the use of faulty electrical equipment or from incorrect use.

You must keep electrical equipment in good condition and test it frequently.

Electrical equipment must be protected by a fuse with an appropriate nominal capacity.

Use low-voltage equipment (**110 volt**) for work lights and inspection lights, wherever possible. Use pneumatic equipment instead of electrical equipment wherever possible.

In the event of electrocution:

- Turn off the electricity before approaching the victim.
- If that is not possible, push or pull the victim away from the source of the electricity using a dry, non-conductive material.
- If you have been trained, start giving first aid.
- Seek medical assistance.

### **Exhaust fumes**

These fumes contain asphyxiating, toxic or harmful chemical substances. You must only run engines in adequate extraction or general ventilation conditions, and never in enclosed spaces.

### **Fiber insulation**

The fibrous nature of cut surfaces and edges can cause skin irritation. In general, the effect is physical and not chemical. You must take precautions to avoid excessive skin contact. Take care when organizing your work methods. Wear sleeves.

### **Fire**

Many materials relating to vehicle repair are highly flammable. Some release toxic or harmful fumes when burned.

Scrupulously observe the fire prevention safety recommendations when storing and handling flammable materials or solvents, particularly in the vicinity of electrical equipment or welding processes.

Before using any electrical or welding equipment, ensure that there is no risk of fire. Always have an appropriate fire extinguisher nearby when using welding or heating equipment.

### **Foams – Polyurethane**

See fire. Used for soundproofing. Cured foams used in seat cushions and finishes. Follow the manufacturer's instructions.

Components that have not reacted are irritants and could be harmful to the eyes and the skin. Wear sleeves and protective goggles. Individuals with chronic respiratory illnesses, asthma, bronchial problems, or a history of allergic illnesses must not work with or be in proximity to uncured materials.

Components, fumes, and aerosol clouds can cause irritation and sensitization reactions, and may be toxic or harmful. You must apply these materials with adequate respiratory protection and adequate ventilation. Do not remove the respirator when you have finished spraying. Keep the respirator on until the fumes and clouds disperse.

Burning uncured components and cured foams can generate toxic and harmful fumes. Do not permit smoking, the presence of naked flames, or the use of electrical equipment during the application of foam, and until the fumes/clouds have dispersed. The hot cutting of cured or partially cured foam must be performed in an environment with a ventilation system with extraction.

### **Kerosene (Paraffin)**

Ingesting kerosene can cause irritation to the mouth and throat. The greatest danger from ingesting kerosene is the possibility of breathing it into the lungs. Liquid contact dries the skin and can cause irritation or dermatitis. Splashes on the skin and in the eyes cause mild irritation.

Avoid contact with the eyes and the skin as far as possible and ensure that there is adequate ventilation.

### **Fuel oil (diesel fuel)**

When the quantities are large or the exposure period is long, skin contact with fuel oils with a high boiling point can cause serious skin diseases, including skin cancer.

### **Gas cylinders**

See fire. In general, gases, such as oxygen, carbon dioxide, argon, and propane, are stored in cylinders with pressures of up to **140 bar ( 2000 lb/in<sup>2</sup>)**. You need to take sufficient care when handling them to prevent physical damage to the cylinders and the valve accessories. The content of each cylinder must be clearly identified with suitable labels.

You must store the cylinders in a well-ventilated room, protected from ice, rain, and direct sunlight. You must not store combustible gases near to oxygen cylinders.

Be careful to prevent leaks from the cylinders and the gas lines, and to avoid ignition sources. Only qualified personnel may perform services using the cylinders.

### **General workshop equipment and tools**

You must keep all equipment and tools in good condition and you must use the correct safety equipment whenever necessary.

Never use tools or equipment for any purpose other than that for which they are intended. Never overload equipment such as hoists, jacks, chassis bases and axles, or hoisting slings. The damage caused by overloading does not always appear immediately and could cause a fatal accident the next time that the equipment is used.

Do not use faulty or damaged equipment or tools, particularly high-speed equipment, such as emery wheels. A damaged emery wheel can disintegrate suddenly and cause serious injury. Use protective goggles whenever you use equipment for grinding, cutting, polishing, or sandblasting.

### **Oil test equipment, lubrication test equipment, and high-pressure air test equipment, in accordance with local legislation**

Always keep high-pressure equipment in good condition and carry out regular maintenance, particularly on connections and fittings. Never point a high-pressure nozzle at the skin as the fluid can cause serious injuries.

### Legal aspects

Various laws and regulations lay down the health and safety requirements for working with materials and equipment in workshops. Always observe the regulations and laws in force in the country in which you are working.

Workshops must comply with the relevant regulations and laws. Consult the local supervisory authorities or related government bodies if you are in any doubt.

### Lubricants and greases

Avoid prolonged or recurrent contact with mineral oils, particularly used oils.

Thoroughly wash the skin after tasks using oil. Do not use gasoline, paraffin, or other solvents to remove oil from the skin. Lubricants and greases can cause mild eye irritation.

You must avoid repeated or prolonged skin contact by wearing protective clothing where necessary. Do not allow your work clothes to become contaminated with oil. Wash or dry clean work clothes regularly. Discard oil-soaked shoes.

Do not use used engine oil as a lubricant or for applications where it might come into contact with the skin.

### Paints

You should preferably perform spraying in a ventilated cab with an exhaust system to remove the fumes and spray from the breathing area. Individuals working in cabs must use respiratory protection. Personnel carrying out small-scale repair work must use respirators with an air supply.

### Solvents

Contact dries out the skin, and prolonged or recurrent contact can cause irritation and dermatitis. Some can be absorbed through the skin in toxic or harmful quantities. Splashes into the eyes can cause serious irritation and even lead to blindness.

Wear protective sleeves, protective goggles and protective clothing. Ensure that there is good ventilation during use, avoid inhaling smoke, fumes, and spray clouds, and keep containers securely closed. Do not use in enclosed spaces.

Do not apply heat or flame, except in accordance with specific and detailed instructions from the manufacturer.

### Arc welding

This process emits a high level of ultraviolet radiation that can burn the eyes and skin of the welder and of other people nearby. Gas-protected welding processes are particularly dangerous in this respect. Personal protection is mandatory. Barriers to protect other people are also necessary. You also need to use suitable eye and skin protection because of metal splashes.

The heat of arc welding will produce gases and fumes from the metals that are being melted, and from the coatings applied to or contamination on the worked surfaces. These gases and fumes may be toxic and you must avoid inhaling them. You may need to use ventilation with extraction to remove smoke from the work area, particularly in cases where there is not enough general ventilation or in places where a considerable amount of welding is expected to take place. In extreme cases, where adequate ventilation cannot be guaranteed, you may need to use respirators with an air supply.

## Safety rules - Ecology and the environment

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances.

### Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- The air-conditioning system contains gases that should not be released into the atmosphere. Consult an air-conditioning specialist or use a special extractor to recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
- Protect hoses during welding. Penetrating weld splatter may burn a hole or weaken hoses, allowing the loss of oils, coolant, etc.

### Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. NEW HOLLAND strongly recommends that you return all used batteries to a NEW HOLLAND dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



### Mandatory battery recycling

**NOTE:** The following requirements are mandatory in Brazil.

Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

Points of sale are obliged to:

- Accept the return of your used batteries
- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling

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## Safety rules

### Personal safety



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual and on machine safety signs, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

**⚠ DANGER** indicates a hazardous situation that, if not avoided, will result in death or serious injury. The color associated with DANGER is RED.

**⚠ WARNING** indicates a hazardous situation that, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

**⚠ CAUTION** indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

### **FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.**

### Machine safety

**NOTICE:** *Notice indicates a situation that, if not avoided, could result in machine damage or property damage. The color associated with Notice is BLUE.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine damage or property damage. The word Notice is used to address practices not related to personal safety.

### Information

**NOTE:** *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

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## Torque - Minimum tightening torques for normal assembly

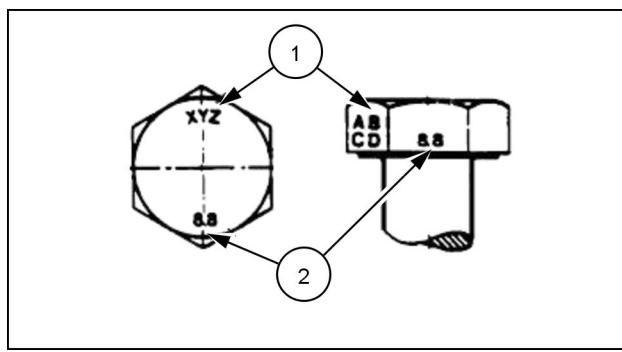
### METRIC NON-FLANGED HARDWARE

NOM. SIZE	CLASS 8.8 BOLT and CLASS 8 NUT		CLASS 10.9 BOLT and CLASS 10 NUT		LOCKNUT CL.8 W/CL8.8 BOLT	LOCKNUT CL.10 W/CL10.9 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr		
M4	2.2 N·m (19 lb in)	2.9 N·m (26 lb in)	3.2 N·m (28 lb in)	4.2 N·m (37 lb in)	2 N·m (18 lb in)	2.9 N·m (26 lb in)
M5	4.5 N·m (40 lb in)	5.9 N·m (52 lb in)	6.4 N·m (57 lb in)	8.5 N·m (75 lb in)	4 N·m (36 lb in)	5.8 N·m (51 lb in)
M6	7.5 N·m (66 lb in)	10 N·m (89 lb in)	11 N·m (96 lb in)	15 N·m (128 lb in)	6.8 N·m (60 lb in)	10 N·m (89 lb in)
M8	18 N·m (163 lb in)	25 N·m (217 lb in)	26 N·m (234 lb in)	35 N·m (311 lb in)	17 N·m (151 lb in)	24 N·m (212 lb in)
M10	37 N·m (27 lb ft)	49 N·m (36 lb ft)	52 N·m (38 lb ft)	70 N·m (51 lb ft)	33 N·m (25 lb ft)	48 N·m (35 lb ft)
M12	64 N·m (47 lb ft)	85 N·m (63 lb ft)	91 N·m (67 lb ft)	121 N·m (90 lb ft)	58 N·m (43 lb ft)	83 N·m (61 lb ft)
M16	158 N·m (116 lb ft)	210 N·m (155 lb ft)	225 N·m (166 lb ft)	301 N·m (222 lb ft)	143 N·m (106 lb ft)	205 N·m (151 lb ft)
M20	319 N·m (235 lb ft)	425 N·m (313 lb ft)	440 N·m (325 lb ft)	587 N·m (433 lb ft)	290 N·m (214 lb ft)	400 N·m (295 lb ft)
M24	551 N·m (410 lb ft)	735 N·m (500 lb ft)	762 N·m (560 lb ft)	1016 N·m (750 lb ft)	501 N·m (370 lb ft)	693 N·m (510 lb ft)

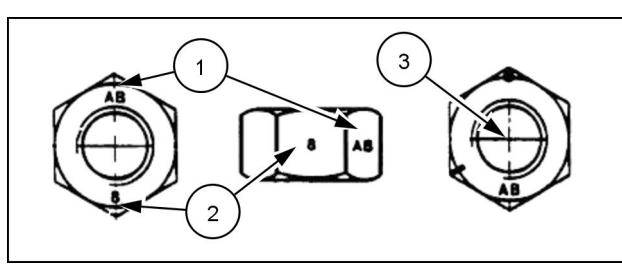
**NOTE:** M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.

**METRIC FLANGED HARDWARE**

NOM. SIZE	CLASS 8.8 BOLT and CLASS 8 NUT		CLASS 10.9 BOLT and CLASS 10 NUT		LOCKNUT CL.8 W/CL8.8 BOLT	LOCKNUT CL.10 W/CL10.9 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr		
M4	2.4 N·m (21 lb in)	3.2 N·m (28 lb in)	3.5 N·m (31 lb in)	4.6 N·m (41 lb in)	2.2 N·m (19 lb in)	3.1 N·m (27 lb in)
M5	4.9 N·m (43 lb in)	6.5 N·m (58 lb in)	7.0 N·m (62 lb in)	9.4 N·m (83 lb in)	4.4 N·m (39 lb in)	6.4 N·m (57 lb in)
M6	8.3 N·m (73 lb in)	11 N·m (96 lb in)	12 N·m (105 lb in)	16 N·m (141 lb in)	7.5 N·m (66 lb in)	11 N·m (96 lb in)
M8	20 N·m (179 lb in)	27 N·m (240 lb in)	29 N·m (257 lb in)	39 N·m (343 lb in)	18 N·m (163 lb in)	27 N·m (240 lb in)
M10	40 N·m (30 lb ft)	54 N·m (40 lb ft)	57 N·m (42 lb ft)	77 N·m (56 lb ft)	37 N·m (27 lb ft)	53 N·m (39 lb ft)
M12	70 N·m (52 lb ft)	93 N·m (69 lb ft)	100 N·m (74 lb ft)	134 N·m (98 lb ft)	63 N·m (47 lb ft)	91 N·m (67 lb ft)
M16	174 N·m (128 lb ft)	231 N·m (171 lb ft)	248 N·m (183 lb ft)	331 N·m (244 lb ft)	158 N·m (116 lb ft)	226 N·m (167 lb ft)
M20	350 N·m (259 lb ft)	467 N·m (345 lb ft)	484 N·m (357 lb ft)	645 N·m (476 lb ft)	318 N·m (235 lb ft)	440 N·m (325 lb ft)
M24	607 N·m (447 lb ft)	809 N·m (597 lb ft)	838 N·m (618 lb ft)	1118 N·m (824 lb ft)	552 N·m (407 lb ft)	

**IDENTIFICATION****Metric Hex head and carriage bolts, classes 5.6 and up**

1. Manufacturer's Identification
2. Property Class

**Metric Hex nuts and locknuts, classes 05 and up**

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1. Manufacturer's Identification
2. Property Class
3. Clock Marking of Property Class and Manufacturer's Identification (Optional), i.e. marks **60** ° apart indicate Class 10 properties, and marks **120** ° apart indicate Class 8.

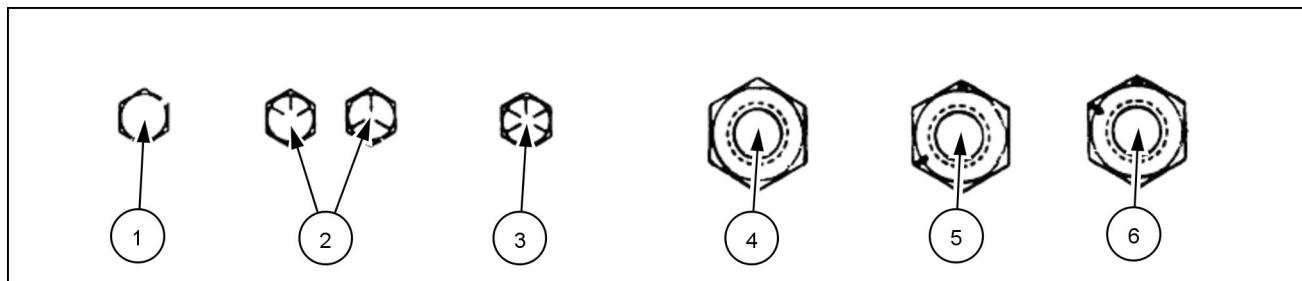
## INCH NON-FLANGED HARDWARE

NOMINAL SIZE	SAE GRADE 5 BOLT and NUT		SAE GRADE 8 BOLT and NUT		LOCKNUT GrB W/ Gr5 BOLT	LOCKNUT GrC W/ Gr8 BOLT
	UN-PLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UN-PLATED or PLATED SILVER	PLATED W/ZnCr GOLD		
1/4	8 N·m (71 lb in)	11 N·m (97 lb in)	12 N·m (106 lb in)	16 N·m (142 lb in)	8.5 N·m (75 lb in)	12.2 N·m (109 lb in)
5/16	17 N·m (150 lb in)	23 N·m (204 lb in)	24 N·m (212 lb in)	32 N·m (283 lb in)	17.5 N·m (155 lb in)	25 N·m (220 lb in)
3/8	30 N·m (22 lb ft)	40 N·m (30 lb ft)	43 N·m (31 lb ft)	57 N·m (42 lb ft)	31 N·m (23 lb ft)	44 N·m (33 lb ft)
7/16	48 N·m (36 lb ft)	65 N·m (48 lb ft)	68 N·m (50 lb ft)	91 N·m (67 lb ft)	50 N·m (37 lb ft)	71 N·m (53 lb ft)
1/2	74 N·m (54 lb ft)	98 N·m (73 lb ft)	104 N·m (77 lb ft)	139 N·m (103 lb ft)	76 N·m (56 lb ft)	108 N·m (80 lb ft)
9/16	107 N·m (79 lb ft)	142 N·m (105 lb ft)	150 N·m (111 lb ft)	201 N·m (148 lb ft)	111 N·m (82 lb ft)	156 N·m (115 lb ft)
5/8	147 N·m (108 lb ft)	196 N·m (145 lb ft)	208 N·m (153 lb ft)	277 N·m (204 lb ft)	153 N·m (113 lb ft)	215 N·m (159 lb ft)
3/4	261 N·m (193 lb ft)	348 N·m (257 lb ft)	369 N·m (272 lb ft)	491 N·m (362 lb ft)	271 N·m (200 lb ft)	383 N·m (282 lb ft)
7/8	420 N·m (310 lb ft)	561 N·m (413 lb ft)	594 N·m (438 lb ft)	791 N·m (584 lb ft)	437 N·m (323 lb ft)	617 N·m (455 lb ft)
1	630 N·m (465 lb ft)	841 N·m (620 lb ft)	890 N·m (656 lb ft)	1187 N·m (875 lb ft)	654 N·m (483 lb ft)	924 N·m (681 lb ft)

**NOTE:** For Imperial Units, **1/4 in** and **5/16 in** hardware torque specifications are shown in pound-inches. **3/8 in** through **1 in** hardware torque specifications are shown in pound-feet.

**INCH FLANGED HARDWARE**

NOMINAL SIZE	SAE GRADE 5 BOLT and NUT		SAE GRADE 8 BOLT and NUT		LOCKNUT GrF W/ Gr5 BOLT	LOCKNUT GrG W/ Gr8 BOLT
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD		
1/4	9 N·m (80 lb in)	12 N·m (106 lb in)	13 N·m (115 lb in)	17 N·m (150 lb in)	8 N·m (71 lb in)	12 N·m (106 lb in)
5/16	19 N·m (168 lb in)	25 N·m (221 lb in)	26 N·m (230 lb in)	35 N·m (310 lb in)	17 N·m (150 lb in)	24 N·m (212 lb in)
3/8	33 N·m (25 lb ft)	44 N·m (33 lb ft)	47 N·m (35 lb ft)	63 N·m (46 lb ft)	30 N·m (22 lb ft)	43 N·m (32 lb ft)
7/16	53 N·m (39 lb ft)	71 N·m (52 lb ft)	75 N·m (55 lb ft)	100 N·m (74 lb ft)	48 N·m (35 lb ft)	68 N·m (50 lb ft)
1/2	81 N·m (60 lb ft)	108 N·m (80 lb ft)	115 N·m (85 lb ft)	153 N·m (113 lb ft)	74 N·m (55 lb ft)	104 N·m (77 lb ft)
9/16	117 N·m (86 lb ft)	156 N·m (115 lb ft)	165 N·m (122 lb ft)	221 N·m (163 lb ft)	106 N·m (78 lb ft)	157 N·m (116 lb ft)
5/8	162 N·m (119 lb ft)	216 N·m (159 lb ft)	228 N·m (168 lb ft)	304 N·m (225 lb ft)	147 N·m (108 lb ft)	207 N·m (153 lb ft)
3/4	287 N·m (212 lb ft)	383 N·m (282 lb ft)	405 N·m (299 lb ft)	541 N·m (399 lb ft)	261 N·m (193 lb ft)	369 N·m (272 lb ft)
7/8	462 N·m (341 lb ft)	617 N·m (455 lb ft)	653 N·m (482 lb ft)	871 N·m (642 lb ft)	421 N·m (311 lb ft)	594 N·m (438 lb ft)
1	693 N·m (512 lb ft)	925 N·m (682 lb ft)	979 N·m (722 lb ft)	1305 N·m (963 lb ft)	631 N·m (465 lb ft)	890 N·m (656 lb ft)

**IDENTIFICATION****Inch Bolts and free-spinning nuts**

20083682 3

**Grade Marking Examples**

SAE Grade Identification			
1	Grade 2 - No Marks	4	Grade 2 Nut - No Marks
2	Grade 5 - Three Marks	5	Grade 5 Nut - Marks 120 ° Apart
3	Grade 8 - Five Marks	6	Grade 8 Nut - Marks 60 ° Apart

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