

# SERVICE MANUAL

## D180C TIER2 / TIER3 Crawler Dozer

Part number 48037327

English  
February 2017



Product: New Holland D180C TIER2/TIER3 Crawler Dozer Service Repair Manual  
Full Download: <https://www.arepairmanual.com/downloads/new-holland-d180c-tier2-tier3-crawler-dozer-service-repair-manual/>



## **SERVICE MANUAL**

**D180C PAT  
D180C BD  
D180C PAT TIER 3  
D180C BD TIER 3**

Sample of manual. Download All 1765 pages at:

<https://www.arepairmanual.com/downloads/new-holland-d180c-tier2-tier3-crawler-dozer-service-repair-manual/>

48037327 20/02/2017

# Link Product / Engine

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<b>Product</b>	<b>Market Product</b>	<b>Engine</b>
D180C PAT	Latin America	F4HFA613N*E002
D180C BD	Latin America	F4HFA613N*E002

# Contents

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## INTRODUCTION

<b>Engine</b> .....	<b>10</b>
[10.001] Engine and crankcase .....	10.1
[10.216] Fuel tanks .....	10.2
[10.250] Turbocharger and lines.....	10.3
[10.254] Intake and exhaust manifolds and muffler .....	10.4
[10.400] Engine cooling system .....	10.5
[10.414] Fan and drive .....	10.6
[10.310] Aftercooler.....	10.7
[10.304] Engine lubrication system.....	10.8
<b>Rear axle system</b> .....	<b>27</b>
[27.120] Planetary and final drives .....	27.1
<b>Hydrostatic drive</b> .....	<b>29</b>
[29.218] Pump and motor components.....	29.1
<b>Brakes and controls</b> .....	<b>33</b>
[33.110] Parking brake or parking lock .....	33.1
[33.202] Hydraulic service brakes .....	33.2
<b>Hydraulic systems</b> .....	<b>35</b>
[35.300] Reservoir, cooler, and filters.....	35.1
[35.104] Fixed displacement pump.....	35.2
[35.106] Variable displacement pump .....	35.3
[35.105] Charge pump.....	35.4
[35.359] Main control valve .....	35.5
[35.741] Dozer blade cylinders .....	35.6
[35.752] Hydraulic fan drive cooling system.....	35.7
[35.000] Hydraulic systems.....	35.8

<b>Frames and ballasting</b> .....	<b>39</b>
[39.100] Frame .....	39.1
<b>Tracks and track suspension</b> .....	<b>48</b>
[48.140] Dropbox and final drive .....	48.1
<b>Cab climate control</b> .....	<b>50</b>
[50.100] Heating .....	50.1
[50.104] Ventilation .....	50.2
<b>Electrical systems</b> .....	<b>55</b>
[55.000] Electrical system .....	55.1
[55.011] Fuel tank system .....	55.2
[55.014] Engine intake and exhaust system.....	55.3
[55.015] Engine control system.....	55.4
[55.030] Service brake electrical system .....	55.5
[55.050] Heating, Ventilation, and Air-Conditioning (HVAC) control system.....	55.6
[55.100] Harnesses and connectors.....	55.7
[55.201] Engine starting system .....	55.8
[55.202] Cold start aid .....	55.9
[55.301] Alternator .....	55.10
[55.302] Battery.....	55.11
[55.512] Cab controls.....	55.12
[55.518] Wiper and washer system.....	55.13
[55.DTC] FAULT CODES.....	55.14
<b>Tools</b> .....	<b>89</b>
[89.128] Ripper assembly .....	89.1
<b>Platform, cab, bodywork, and decals</b> .....	<b>90</b>
[90.150] Cab.....	90.1
[90.114] Operator protections .....	90.2

[90.100] Engine hood and panels ..... 90.3





# INTRODUCTION

# Contents

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## INTRODUCTION

Safety rules (*) .....	3
Safety rules - Ecology and the environment (*) .....	4
Safety rules - Do not operate tag (*) .....	5
Safety rules - Personal safety (*) .....	6
Basic instructions - Important notice regarding equipment servicing (*) .....	8
Basic instructions - Shop and assembly (*) .....	9
Torque - Special torques (*) .....	11
General specification (*) .....	13
Conversion factors (*) .....	17
Consumables - Loctite® product chart (*) .....	19
Hydraulic contamination (*) .....	25

(\*) See content for specific models

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## Safety rules

D180C

### 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 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.

 WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

 CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

**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 or property damage.

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine 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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## Safety rules - Ecology and the environment

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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 CONSTRUCTION strongly recommends that you return all used batteries to a NEW HOLLAND CONSTRUCTION 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

## Safety rules - Do not operate tag

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### **⚠ WARNING**

**Maintenance hazard!**

**Before you start servicing the machine, attach a DO NOT OPERATE warning tag to the machine in a visible area.**

**Failure to comply could result in death or serious injury.**

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Attach a DO NOT OPERATE (TAG) to the machine in an area that is clearly visible whenever the machine is not operating properly and/or requires service.

Complete the tag information for the "REASON" the tag is attached by describing the malfunction or service required. Validate the reason for attaching the tag by signing your name in the designated area on the tag.

The tag should only be removed by the person who signed and attached the tag, after validating the repairs or services have been completed.

(A)		(D)
(B)	<p>See Other Side</p>	(E)
(C)	<p>CNH Part Number 87358697</p> <p>Printed in U.S.A.</p>	(F)

87358697 1

### Tag Components

- A. DO NOT REMOVE THIS TAG! - (Warning) The tag should only be removed by the person who signed and attached the tag, after validating the repairs or services have been completed.
- B. See Other Side - (Reference to additional information on opposite side of the tag.)
- C. CNH Part Number - (Request this part number from you Service Parts Dealer to obtain this DO NOT OPERATE tag.)
- D. DO NOT OPERATE - (Warning!)
- E. REASON - (Area for describing malfunction or service required before operation.)
- F. Signed by - (Signature area - to be signed by the person validating the reason for installation of the tag.)

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## Safety rules - Personal safety

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### General maintenance safety

Keep the area used for servicing the machine clean and dry. Clean up spilled fluids.

Service the machine on a firm, level surface.

Install guards and shields after you service the machine.

Close all access doors and install all panels after servicing the machine.

Do not attempt to clean, lubricate, clear obstructions, or make adjustments to the machine while it is in motion or while the engine is running.

Always make sure that working area is clear of tools, parts, other persons and pets before you start operating the machine.

Unsupported hydraulic cylinders can lose pressure and drop the equipment, causing a crushing hazard. Do not leave equipment in a raised position while parked or during service, unless the equipment is securely supported.

Jack or lift the machine only at jack or lift points indicated in this manual.

Incorrect towing procedures can cause accidents. When you tow a disabled machine follow the procedure in this manual. Use only rigid tow bars.

Stop the engine, remove the key, and relieve pressure before you connect or disconnect fluid lines.

Stop the engine and remove the key before you connect or disconnect electrical connections.

Scalding can result from incorrect removal of coolant caps. Cooling systems operate under pressure. Hot coolant can spray out if you remove a cap while the system is hot. Allow the system to cool before you remove the cap. When you remove the cap, turn it slowly to allow pressure to escape before you completely remove the cap.

Replace damaged or worn tubes, hoses, electrical wiring, etc.

The engine, transmission, exhaust components, and hydraulic lines may become hot during operation. Take care when you service such components. Allow surfaces to cool before you handle or disconnect hot components. Wear protective equipment when appropriate.

When welding, follow the instructions in the manual. Always disconnect the battery before you weld on the machine. Always wash your hands after you handle battery components.

### General battery safety

Always wear eye protection when you work with batteries.

Do not create sparks or have open flame near a battery.

Ventilate the area when you charge a battery or use a battery in an enclosed area.

Disconnect the negative (-) terminal first and reconnect the negative (-) terminal last.

When you weld on the machine, disconnect both terminals of the battery.

Do not weld, grind, or smoke near a battery.

When you use auxiliary batteries or connect jumper cables to start the engine, use the procedure shown in the operator's manual. Do not short across terminals.

Follow the manufacturer's instructions when you store and handle batteries.

Battery post, terminals, and related accessories contain lead and lead compounds. Wash hands after handling. This is a California Proposition 65 warning.

Battery acid causes burns. Batteries contain sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.

Keep out of reach of children and other unauthorized persons.

### **Air-conditioning system**

The air-conditioning system is under high pressure. Do not disconnect any lines. The release of high pressure can cause serious injury.

The air-conditioning system contains gases that are harmful to the environment when released into the atmosphere. Do not attempt to service or repair the system.

Only trained service technicians can service, repair, or recharge the air-conditioning system.

### **Personal Protective Equipment (PPE)**

Wear Personal Protective Equipment (PPE) such as hard hat, eye protection, heavy gloves, hearing protection, protective clothing, etc.

### **Do Not Operate tag**

Before you start servicing the machine, attach a 'Do Not Operate' warning tag to the machine in an area that will be visible.

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## **Basic instructions - Important notice regarding equipment servicing**

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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 information in this manual is up-to-date at the date of the publication. It is the policy of the manufacturer for continuous improvement. Some information could not be updated due to modifications of a technical or commercial type, or changes to the laws and regulations of different countries.

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

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## Basic instructions - Shop and assembly

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### Shimming

For each adjustment operation, select adjusting shims and measure the adjusting shims individually using a micrometer, then add up the recorded values. Do not rely on measuring the entire shimming set, which may be incorrect, or the rated value shown on each shim.

### Rotating shaft seals

For correct rotating shaft seal installation, proceed as follows:

1. Before assembly, allow the seal to soak in the oil it will be sealing for at least thirty minutes.
2. Thoroughly clean the shaft and check that the working surface on the shaft is not damaged.
3. Position the sealing lip facing the fluid.

**NOTE:** *With hydrodynamic lips, take into consideration the shaft rotation direction and position the grooves so that they will move the fluid towards the inner side of the seal.*

4. Coat the sealing lip with a thin layer of lubricant (use oil rather than grease). Fill the gap between the sealing lip and the dust lip on double lip seals with grease.
5. Insert the seal in its seat and press down using a flat punch or seal installation tool. Do not tap the seal with a hammer or mallet.
6. While you insert the seal, check that the seal is perpendicular to the seat. When the seal settles, make sure that the seal makes contact with the thrust element, if required.
7. To prevent damage to the seal lip on the shaft, position a protective guard during installation operations.

### O-ring seals

Lubricate the O-ring seals before you insert them in the seats. This will prevent the O-ring seals from overturning and twisting, which would jeopardize sealing efficiency.

### Sealing compounds

Apply a sealing compound on the mating surfaces when specified by the procedure. Before you apply the sealing compound, prepare the surfaces as directed by the product container.

### Spare parts

Only use CNH Original Parts or NEW HOLLAND CONSTRUCTION Original Parts.

Only genuine spare parts guarantee the same quality, duration, and safety as original parts, as they are the same parts that are assembled during standard production. Only CNH Original Parts or NEW HOLLAND CONSTRUCTION Original Parts can offer this guarantee.

When ordering spare parts, always provide the following information:

- Machine model (commercial name) and Product Identification Number (PIN)
- Part number of the ordered part, which can be found in the parts catalog

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## Protecting the electronic and/or electrical systems during charging and welding

To avoid damage to the electronic and/or electrical systems, always observe the following practices:

1. Never make or break any of the charging circuit connections when the engine is running, including the battery connections.
2. Never short any of the charging components to ground.
3. Always disconnect the ground cable from the battery before arc welding on the machine or on any machine attachment.
  - Position the welder ground clamp as close to the welding area as possible.
  - If you weld in close proximity to a computer module, then you should remove the module from the machine.
  - Never allow welding cables to lie on, near, or across any electrical wiring or electronic component while you weld.
4. Always disconnect the negative cable from the battery when charging the battery in the machine with a battery charger.

**NOTICE:** *If you must weld on the unit, you must disconnect the battery ground cable from the machine battery. The electronic monitoring system and charging system will be damaged if this is not done.*

5. Remove the battery ground cable. Reconnect the cable when you complete welding.

### WARNING

**Battery acid causes burns. Batteries contain sulfuric acid.**

**Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately. Failure to comply could result in death or serious injury.**

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## Special tools

The special tools that NEW HOLLAND CONSTRUCTION suggests and illustrate in this manual have been specifically researched and designed for use with NEW HOLLAND CONSTRUCTION machines. The special tools are essential for reliable repair operations. The special tools are accurately built and rigorously tested to offer efficient and long-lasting operation.

By using these tools, repair personnel will benefit from:

- Operating in optimal technical conditions
- Obtaining the best results
- Saving time and effort
- Working in safe conditions

## Torque - Special torques

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### Ripper

Component	Torque
Ripper mounting bolts	1016 – 1375 N·m (749 – 1014 lb ft)
Ripper pin retaining and tube cover bolts	301 – 407 N·m (222 – 300 lb ft)

### Fuse and Relay Blocks

Component	Torque
Fuse block mounting	6.5 N·m (4.8 lb ft)

### Pumps and Motors

Component	Torque
Pump mount bolts to cover	587 – 690 N·m (433 – 509 lb ft)
Motor mount bolts to final drives	250 – 280 N·m (184 – 207 lb ft)
Pump to motor hoses spit flange clamps	90 – 100 Nm ( 66 – 74 lb ft)
Inlet hose clamps	6.5 – 7.6 Nm ( 58 – 68 lb in)

### Rear Frame Cover

Component	Torque
M24 hex bolts	449 – 725 N·m (331 – 535 lb ft)
M16 hex bolts	230 – 371 N·m (170 – 274 lb ft)

### Track

Component	Torque
Master link bolts (Use LOCTITE® 242® on master link bolts.)	610 – 670 N·m (450 – 494 lb ft)
Standard link shoe bolts	610 – 670 N·m (450 – 494 lb ft)

### Final Drives

Component	Torque
Drive Hub Rolling Torque	10 – 24 N·m (7 – 18 lb ft)
Input Shaft Bearing Retainer Plate Mounting Bolts	77 – 87 N·m (57 – 64 lb ft)
Park Brake Housing Plate	77 – 87 N·m (57 – 64 lb ft)
Brake Housing Cover - M20 X 50 12 pnt	650 – 730 N·m (479 – 538 lb ft)
Brake Line Fitting	55 – 60 N·m (41 – 44 lb ft)
Brake Bleeder Fitting	24 – 30 N·m (18 – 22 lb ft)
Counter Shaft Bearing Retainer Plate Mounting Bolts	135 – 150 N·m (100 – 111 lb ft)
Spindle Housing	335 – 375 N·m (247 – 277 lb ft)
Ring Gear Retaining Plate	335 – 375 N·m (247 – 277 lb ft)
Sun Gear Shaft Retaining Plate	135 – 150 N·m (100 – 111 lb ft)
Output Gear Bearing Retainer Plate Mounting Bolts	135 – 150 N·m (100 – 111 lb ft)
Planetary Carrier to Drive Hub	335 – 375 N·m (247 – 277 lb ft)
Final Drive Housing to Frame Mounting Bolts	656 – 725 N·m (484 – 535 lb ft)
Fill Check Plug	24 – 30 N·m (18 – 22 lb ft)
Drain Plug	24 – 30 N·m (18 – 22 lb ft)

### Cab Mounting

Component	Torque
Support mount bolts	733 – 854 N·m (541 – 630 lb ft)
Brush guard mount bolts (if equipped)	587 – 794 N·m (433 – 586 lb ft)

INTRODUCTION

**Air Conditioning Compressor**

Component	Torque
Compressor rotor shaft nut	15 – 20 Nm ( 11 – 15 lb ft)
Oil filler plug	15 – 24 Nm ( 11 – 18 lb ft)
Dust cover screws	7 – 11 Nm ( 5 – 8 lb ft)

**Lift Cylinder**

Component	Torque
Piston bolt	2160 – 2450 N·m (1593 – 1807 lb ft)
Gland	135 – 542 Nm (100 – 400 lb ft)

**Tilt Cylinder**

Component	Torque
Piston bolt	2160 – 2450 N·m (1593 – 1807 lb ft)
Gland	135 – 542 Nm (100 – 400 lb ft)

**Angle Cylinder**

Component	Torque
Piston bolt	2160 – 2450 N·m (1593 – 1807 lb ft)
Gland	135 – 542 Nm (100 – 400 lb ft)

**Ripper Cylinder**

Component	Torque
Piston bolt	2830 – 3210 N·m (2087 – 2368 lb ft)
Gland	135 – 542 Nm (100 – 400 lb ft)

**Starter**

Component	Torque
Mounting bolts	68 – 77 Nm (50 – 57 lb ft)
Battery terminal nut	17.7 – 24.5 Nm (13 – 18 lb ft)
Solenoid + screw	2.6 – 4.5 Nm (23 – 40 lb in)

**Multifunction valve**

Component	Torque
Brake valve	3 – 4 N·m (2 – 3 lb ft)
Brake valve screws	3 – 4 N·m (2 – 3 lb ft)
Cartridge valve	32.6 – 35.4 N·m (24.0 – 26.1 lb ft)
Check valve	150 – 177 N·m (111 – 131 lb ft)

**Powertrain specifications**

Component	Torque
Cradle to chassis front	185 – 200 N·m (136 – 148 lb ft)
Cradle to chassis rear	70 – 80 N·m (52 – 59 lb ft)
Hydrostatic motor mounting bolts to park brake housing	250 – 280 N·m (184 – 207 lb ft)
Engine to coupler	41 – 50 N·m (30 – 37 lb ft)
Tandem pump to cradle rear mounting bracket	265 – 305 N·m (195 – 225 lb ft)
Hydrostatic pump to pump mounting plate	587 – 690 N·m (433 – 509 lb ft)
Pump coupler retainer plate	136 – 156 N·m (100 – 115 lb ft)
Cradle mid mount	225 – 305 N·m (166 – 225 lb ft)
Engine to cradle front	107 – 123 N·m (79 – 91 lb ft)

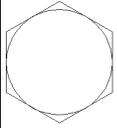
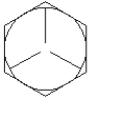
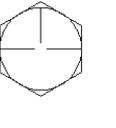
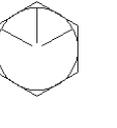
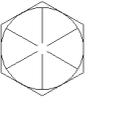
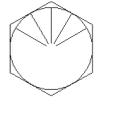
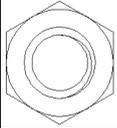
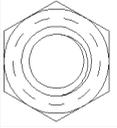
# General specification

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## Bolt torque information

### Decimal Hardware

1. Replace the fasteners with the same or higher grade. If you use a higher grade fastener, tighten to the strength of the original.
2. Clean the threads of the fasteners and start the thread engagement. This will prevent failure of the fasteners when you tighten them.
3. Tighten the plastic insert or the crimped steel-type lock nuts to approximately **50%** of the dry torque, applied to the nut, not to the bolt head. Tighten the toothed or the serrated-type lock nuts to the full torque value.
4. The L9 (Alloy) fasteners torque values are for a bolt, nut, and two washers.  
When you use the L9 (Alloy) fasteners, do not use the values in this table for tapped holes.

	Grade						
	1 or 2	5	5.1	5.2	8	8.2	L9 (Alloy)
SAE markings for bolts and cap screws							
	2	5			8		L9 (Alloy)
SAE markings for hex nuts							

Size	Grade 2 *				Grade 5, 5.1 or 5.2				Grade 8 or 8.2				Grade L9 (Alloy)			
	Dry **		Lubricated **		Dry**		Lubricated **		Dry**		Lubricated **		Head		Nut	
	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft
1/4 UNF	7.5	5.5	5.7	4.2	10.8	8	8.5	6.3	16.3	12	12.2	9	13.6	10	14.9	11
1/4 UNC	8.5	6.3	6.4	4.7	13.6	10	9.8	7.2	19	14	13.6	10	16.3	12	17.6	13
5/16 UNF	15	11	11	8	23	17	18	13	33	24	24	18	26	19	28	21
5/16 UNC	16	12	12	9	26	19	19	14	37	27	27	20	27	20	31	23
3/8 UNF	27	20	20	15	41	30	31	23	61	45	47	35	41	30	45	33
3/8 UNC	31	23	23	17	47	35	34	25	68	50	47	35	47	35	52	38
7/16 UNF	43	32	33	24	68	50	47	35	95	70	68	50	75	55	81	60
7/16 UNC	49	36	37	27	75	55	54	40	108	80	81	60	81	60	88	65
1/2 UNF	68	50	47	35	102	75	75	55	149	110	108	80	115	85	129	95
1/2 UNC	75	55	54	40	115	85	88	65	163	120	122	90	129	95	142	105
9/16 UNF	95	70	75	55	149	110	108	80	203	150	149	110	163	120	190	140
9/16 UNC	108	80	81	60	163	120	122	90	231	170	176	130	183	135	203	150

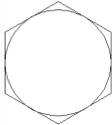
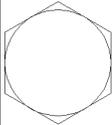
INTRODUCTION

Size	Grade 2 *				Grade 5, 5.1 or 5.2				Grade 8 or 8.2				Grade L9 (Alloy)			
	Dry **		Lubricated **		Dry**		Lubricated **		Dry**		Lubricated **		Head		Nut	
	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft	Nm	lb/ft
5/8 UNF	136	100	102	75	203	150	149	110	285	210	217	160	231	170	251	185
5/8 UNC	149	110	115	85	231	170	176	130	325	240	244	180	258	190	278	205
3/4 UNF	237	175	176	130	353	260	271	200	515	380	380	280	359	265	393	290
3/4 UNC	271	200	190	140	407	300	298	220	570	420	420	310	447	330	481	355
7/8 UNF	231	170	170	125	583	430	434	320	814	600	610	450	644	475	685	505
7/8 UNC	244	180	190	140	637	470	475	350	909	670	678	500	705	520	793	585
1 UNF	339	250	258	190	868	640	651	480	1234	910	922	680	746	550	1051	775
1 UNC	380	280	285	210	976	720	732	540	1383	1020	1031	760	949	700	1220	900
1-1/8 UNF	475	350	366	270	1071	790	800	590	1749	1290	1315	970	1390	1025	1559	1150
1-1/8 UNC	542	400	407	300	1207	890	909	670	1953	1440	1464	1080	1559	1150	1797	1325
1-1/4 UNF	678	500	515	380	1519	1120	1139	840	2468	1820	1844	1360	1898	1400	2170	1600
1-1/4 UNC	746	550	570	420	1681	1240	1261	930	2726	2010	2048	1510	2170	1600	2373	1750
1-1/2 UNF	1180	870	881	650	2644	1950	1980	1460	4285	3160	3214	2370	3932	2900	4407	3250
1-1/2 UNC	1329	980	990	730	2983	2200	2224	1640	4827	3560	3621	2670	4475	3300	4949	3650

**NOTICE:** DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically. Shear bolts are designed to fail under predetermined loads. Always replace the shear bolts with the identical grade.

- \* - Grade 2 applies for hex caps (not hex bolts) up to **152 mm ( 6 in )** long. Grade 1 applies for hex cap screws over **152 mm ( 6 in )** long, and for all other types of bolts and screws of any length.
- \*\* - "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. "Dry" means plain or zinc plated without any lubrication.

**Torque specifications- Metric Hardware**

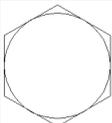
Grade 8.8 Bolts, Nuts and Studs				Grade 10.9 Bolts, Nuts and Studs		
Size	Dry			Dry		
	Nm	lb/in	lb/ft	Nm	lb/in	lb/ft
						
M4	3 to 4	31 to 35		5 to 6	44 to 49	
M5	5 to 6	49 to 55		8 to 9	71 to 79	
M6	10 to 11	84 to 94		14 to 15	120 to 136	
M8	23 to 26	229 to 277		33 to 37	293 to 329	
M10	46 to 51	408 to 460		65 to 74		48 to 54
M12	80 to 90		59 to 66	114 to 128		85 to 94
M14	128 to 145		94 to 106	183 to 205		136 to 153
M16	200 to 220		149 to 161	285 to 320		208 to 235
M20	400 to 450		293 to 330	555 to 620		406 to 460

INTRODUCTION

Grade 8.8 Bolts, Nuts and Studs				Grade 10.9 Bolts, Nuts and Studs		
Dry				Dry		
Size	Nm	lb/in	lb/ft	Nm	lb/in	lb/ft
M24	690 to 780		510 to 575	955 to 1075		705 to 790
M30	1375 to 1545		1010 to 1140	1900 to 2140		1400 to 1580
M36	2400 to 2700		1770 to 1990	3315 to 3730		2445 to 2750

Use the above torques when specifications are not given.

These values apply to fasteners with both coarse and fine threads as received from the supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or Molydisulfide grease or oil is used. Use of a click type torque wrench, or better is required.

Grade 12.9 Bolts, Nuts, and Studs	
	

Usually torque values specified to grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

• Torque specifications - Steel hydraulic fittings

37 Degree flare fitting						
Nom. SAE dash size	Tube OD/Hose ID		Thread size	Newton metres	lb/in	lb/ft
-2			5/16 - 24	8 to 9	72 to 84	
-3			3/8 - 24	11 to 12	96 to 108	
-4	6.4 mm	1/4 inch	7/16 - 20	14 to 16	120 to 144	
-5	7.9 mm	5/16 inch	1/2 - 20	18 to 21	156 to 192	
-6	9.5 mm	3/8 inch	9/16 - 18	27 to 33	240 to 300	
-8	12.7 mm	1/2 inch	3/4 - 16	46 - 56	408 to 504	
-10	15.9 mm	5/8 inch	7/8 - 14	77 to 85	684 to 756	
-12	19.0 mm	3/4 inch	1-1/16 - 12	107 to 119		79 to 88
-14	22.2 mm	7/8 inch	1-3/16 - 12	127 to 140		94 to 103
-16	25.4 mm	1.0 inch	1-5/16 - 12	131 to 156		97 to 117
-20	31.8 mm	1-1/4 inch	1-5/8 - 12	197 to 223		145 to 165
-24	38.1 mm	1-1/2 inch	1-7/8 - 12	312 to 338		230 to 250

Straight thread with O-ring						
Nom. SAE dash size	Tube OD/Hose ID		Thread Size	Newton metres	lb/in	lb/ft
-2			5/16 - 24	8 to 9	72 to 84	
-3			3/8 - 24	11 to 12	96 to 108	
-4	6.4 mm	1/4 inch	7/16 - 20	20 to 25	180 to 228	
-5	7.9 mm	5/16 inch	1/2 - 20	27 to 33	240 to 300	
-6	9.5 mm	3/8 inch	9/16 - 18	43 to 54	384 to 480	
-8	12.7 mm	1/2 inch	3/4 - 16	73 to 90	648 to 804	
-10	15.9 mm	5/8 inch	7/8 - 14	100 to 124		74 to 92
-12	19.0 mm	3/4 inch	1-1/16 - 12	138 to 173		102 to 128
-14	22.2 mm	7/8 inch	1-3/16 - 12	173 to 216		128 to 160
-16	25.4 mm	1.0 inch	1-5/16 - 12	203 to 253		150 to 187
-20	31.8 mm	1-1/4 inch	1-5/8 - 12	308 to 357		227 to 264
-24	38.1 mm	1-1/2 inch	1-7/8 - 12	492 to 542		363 to 400

Split flange mounting bolts			
Size	Newton metres	lb/in	lb/ft
5/16 - 18	20 to 27	180 to 240	
3/8 - 16	27 to 34	240 to 300	
7/16 - 14	47 to 61	420 to 540	
1/2 - 13	74 to 88		55 to 65
5/8 - 11	190 to 203		140 to 150

INTRODUCTION

O-ring face seal end						
Nom. SAE dash size	Tube OD		Thread size	Newton metres	lb/in	lb/ft
-4	6.4 mm	1/4 inch	9/16 - 18	23 to 26	204 to 228	
-6	9.5 mm	3/8 inch	11/16 - 16	34 to 40	300 to 348	
-8	12.7 mm	1/2 inch	13/16 - 16	52 to 57	456 to 504	
-10	15.9 mm	5/8 inch	1-14	81 to 90	720 to 792	
-12	19.0 mm	3/4 inch	1-3/16 - 12	117 to 128		86 to 94
-16	25.4 mm	1.0 inch	1-7/16 - 12	152 to 174		112 to 128
-20	31.8 mm	1-1/4 inch	1-11/16 - 12	179 to 201		132 to 148
-24	38.1 mm	1-1/2 inch	2 - 12	213 to 235		157 to 173

O-ring boss end fitting or lock nut				
Nom. SAE dash size	Thread size	Newton metres	lb/in	lb/ft
-6	9/16 - 18	48 to 54	432 to 480	
-8	3/4 - 16	70 to 78	612 to 684	
-10	7/8 - 14	102 to 114		75 to 84
-12	1-1/16 - 12	142 to 160		105 to 117
-16	1-5/16 - 12	237 to 254		175 to 187

Pipe fitting		
Non. SAE dash size	Thread size	TFFT (Turns For Finger Tight)
-2	1/8 - 27	2.0 - 3.0
-3	1/8 - 27	2.0 - 3.0
-4	1/8 - 27	2.0 - 3.0
-5	1/8 - 27	2.0 - 3.0
-6	1/4 - 18	1.5 - 3.0
-8	3/8 - 18	2.0 - 3.0
-10	1/2 - 14	2.0 - 3.0
-12	3/4 - 14	2.0 - 3.0
-14	3/4 - 14	2.0 - 3.0
-16	1 - 11-1/2	1.5 - 2.5
-20	1-1/4 - 11-1/2	1.5 - 2.5
-24	1-1/2 - 11-1/2	1.5 - 2.5
-32	2 - 11-1/2	1.5 - 2.5

**NOTE:** Apply a sealant/lubricant to the male pipe threads. The first two threads should be left uncovered to avoid system contamination. Screw the pipe fitting into the female pipe port to the finger tight position. Wrench tighten the fitting to the appropriate turns from finger tight (TFFT) shown in the table above. Make sure the tube end of an elbow or tee fitting is aligned to receive the incoming tube or hose fitting.

## Conversion factors

D180C

Metric to U.S.			
	MULTIPLY	BY	TO OBTAIN
AREA:	square meter	10.763 91	square foot
	hectare	2.471 05	acre
FORCE:	newton	3.596 942	ounce force
	newton	0.224 809	pound force
LENGTH:	millimeter	0.039 370	inch
	meter	3.280 840	foot
	kilometer	0.621 371	mile
MASS:	kilogram	2.204 622	pound
MASS/AREA:	kilogram/hectare	0.000 466	ton/acre
MASS/ENERGY:	gr/kW/hr.	0.001 644	lbs/hp/hr.
MASS/VOLUME:	kg/cubic meter	1.685 555	lb/cubic yd.
POWER:	kilowatt	1.341 02	horsepower
PRESSURE:	kilopascal	0.145 038	lb/sq. inch
	bar	14.50385	lb/sq. inch
TEMPERATURE:	degree C	1.8 x C +32	degree F
TORQUE:	newton meter	8.850 748	lb/inch
	newton meter	0.737 562	lb/foot
VELOCITY:	kilometer/hr.	0.621 371	miles/hr.
VOLUME:	cubic centimeter	0.061 024	cubic inch
	cubic meter	35.314 66	cubic foot
	cubic meter	1.307 950	cubic yd.
	milliliter	0.033 814	ounce (US fluid)
	litre	1.056 814	quart (US liquid)
	litre	0.879 877	quart (Imperial)
	litre	0.264 172	gallon (US liquid)
	litre	0.219 969	gallon (Imperial)
VOLUME/TIME:	litre/min.	0.264 172	gallon/min. (US liquid)
	litre/min.	0.219 969	gallon/min. (Imperial)

U.S. to Metric			
	MULTIPLY	BY	TO OBTAIN
AREA:	square foot	0.092 903	square meter
	acre	0.404 686	hectare
FORCE:	ounce force	0.278 014	newton
	pound force	4.448 222	newton
LENGTH:	inch	25.4 *	millimeter
	foot	0.304 8 *	meter
	mile	1.609 344 *	kilometer
MASS:	pound	0.453 592	kilogram
	ounce	28.35	gram
MASS/AREA:	ton/acre	2241 702	kilogram/hectare
MASS/ENERGY:	lb/hp/hr	608.277 4	gr/kW/hr
MASS/VOLUME:	lb/cubic yd.	0.593 276	kg/cubic meter
POWER:	horsepower	0.745 700	kilowatt
PRESSURE:	lbs/sq. in	6.894 757	kilopascal
	lbs/sq. in	0.069	bar
	lbs/sq. in	0.070 303	kg/sq. cm
TEMPERATURE:	degree F	1.8 F - 32	degree C
TORQUE:	pound/inch	0.112 985	newton meter
	pound/foot	1.355 818	newton meter
VELOCITY:	miles/hr.	1.609 344 *	kilometer/hr.

INTRODUCTION

U.S. to Metric			
	MULTIPLY	BY	TO OBTAIN
VOLUME:	cubic inch	16.387 06	cubic centimeter
	cubic foot	0.028 317	cubic meter
	cubic yard	0.764.555	cubic meter
	ounce (US fluid)	29.573 53	milliliter
	quart (US liquid)	0.946 353	litre
	quart (Imperial)	1.136 523	litre
	gallon (US)	3.785 412	litre
	gallon (Imperial)	4.546 092	litre
VOLUME/TIME:	gallon/min.	3.785 412	litre/min.

## Consumables - Loctite® product chart

D180C

Bonding adhesives					
Product	Color	Strength	Fixture/Full Cure (Steel/Steel) Time	Recommended Primer or Activator	Description
312	Clear	<b>9.8 – 17.2 MPa</b> (1421 – 2495 psi)	2 min/24 hrs	736	Typical applications include bonding dissimilar materials such as metals, glass or ceramics and where fast fixturing is required between close fitting parts.
324	Light amber	<b>34 – 614 MPa</b> (4932 – 89061 psi)	30 min/24 hrs	7075	Is used to bond flat parts together. Especially suitable for joining dissimilar materials, e.g. ferrite to plated materials in electric motors, loudspeakers, etc. This product is specifically formulated for toughness and impact strength.
326	Yellow to light amber	<b>34 – 300 MPa</b> (4932 – 43515 psi)	3 min/6 hrs	7649 on one surface	Typical applications include bonding ferrites to plated materials in electric motors, loudspeaker hardware and jewelry where fast fixturing is required.
380	Black	<b>26 MPa</b> (3770 psi)	2 min/24 hrs	none	Is a rubber toughened adhesive with increased flexibility and peel strength along with enhanced resistance to shock.
409	Clear to slightly cloudy	<b>18 – 26 MPa</b> (2611 – 3771 psi)	2 min/24 hrs	none	Is a general purpose cyanoacrylate adhesive gel. The gel consistency prevents adhesive flow even on vertical surfaces.
426	Black	<b>4.8 – 20.7 MPa</b> (696 – 3003 psi)	10 sec/40 sec.	none	Is an adhesive gel toughened with elastomers for impact and peel strength along with improved resistance to heat and humidity.
454	Clear to slightly cloudy	<b>19 – 28 MPa</b> (2756 – 4061 psi)	1 min/72 hrs	none	Is particularly suited for bonding porous or absorbent materials such as wood, paper, leather and fabric.
455	Clear to light yellow	<b>9.7 MPa</b> (1407 psi)	30 sec/24 hrs	none	Is a general purpose cyanoacrylate adhesive gel with low odor and low blooming properties and is particularly suitable for applications where vapor control is difficult.
480	Black	<b>22 – 30 MPa</b> (3191 – 4352 psi)	2 min/24 hrs	none	Is a rubber toughened adhesive with increased flexibility and peel strength along with enhanced resistance to shock.
495	Clear to straw colored	<b>12 – 26 MPa</b> (1741 – 3771 psi)	10 sec/30 sec.	none	Is a general purpose cyanoacrylate instant adhesive.
E60HP	Pale yellow	<b>29.8 MPa</b> (4322 psi)	3 hrs/24 hrs	none	Is a toughened, medium viscosity, industrial grade epoxy adhesive with extended work life. Once mixed, the two-component epoxy cures at room temperature to form a tough, off-white, bond line which provides high peel resistance and high shear strengths. The fully cured epoxy is resistant to a wide range of chemicals and solvents, and acts as an excellent electrical insulator.

INTRODUCTION

Surface preparation			
Product	Color	Active (Steel/Steel) Time	Description
7380	Yellow to light amber	6 hours	Is designed to initiate the cure of Loctite toughened acrylic adhesives.
7471	Yellow to light amber	30 to 70 seconds	Is used where increased cure speed of LOCTITE® anaerobic products is required. It is especially recommended for applications with passive metals or inert surfaces and with large bond gaps. Is particularly recommended when prevailing temperature is low < <b>15 °C (60 °F)</b> .
7649	Green	30 to 70 seconds	Is used where increased cure speed of LOCTITE® anaerobic products is required. It is especially recommended for applications with passive metals or inert surfaces and with large bond gaps. Is particularly recommended when prevailing temperature is low < <b>15 °C (60 °F)</b> .

Retain, cylindrical assemblies					
Product	Color	Strength	Fixture/Full Cure (Steel/Steel) Time	Recommended Primer or Activator	Description
603	Green	<b>13.5 – 22.5 MPa (1958 – 3264 psi)</b>	7 min/6 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts, particularly where consistently clean surfaces cannot be assured. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include retaining roller bearings or oil impregnated bushings into housings.
609	Green	<b>10.3 – 15.8 MPa (1494 – 2292 psi)</b>	25 min/6 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include rotor to shafts in fractional and subfractional horsepower motors. Locks bushings and sleeves in housings on shafts. Augments press fits.
620	Green	<b>17.2 – 24.1 MPa (2495 – 3496 psi)</b>	1 hr 10 min/18 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include locating pins in radiator assemblies, sleeves into pump housings and bearings in auto transmissions. Particularly suitable for applications where temperature resistance up to <b>200 °C (395 °F)</b> is required.
635	Green opaque	<b>13.8 – 31.0 MPa (2002 – 4497 psi)</b>	30 min/72 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include rotor to shafts in fractional and subfractional horsepower motors. Locks bushings and sleeves in housings on shafts. Augments press fits.

INTRODUCTION

<b>Retain, cylindrical assemblies</b>					
<b>Product</b>	<b>Color</b>	<b>Strength</b>	<b>Fixture/Full Cure (Steel/Steel) Time</b>	<b>Recommended Primer or Activator</b>	<b>Description</b>
638	Green	<b>13.5 – 25.0 MPa (1958 – 3626 psi)</b>	4 min/6 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts, particularly where bond gaps can approach 0.25 mm (0.01 in.) and where maximum strength at room temperature is required. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include locking bushings and sleeves into housings and on shafts.
648	Green	<b>13.5 – 25.0 MPa (1958 – 3626 psi)</b>	4 min/1.5 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Typical applications include holding gears and sprockets onto gearbox shafts and rotors on electric motor shafts.
660	Metallic grey	<b>17.2 MPa (2495 psi)</b>	15 min/1.5 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts, particularly where bond gaps can approach 0.50 mm (0.02 in). The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. This product possesses excellent gap cure characteristics. Typical applications include restoring correct fits on worn shafts, spun bearings, and damaged keyways.
680	Green	<b>19.3 – 24.1 MPa (2799 – 3496 psi)</b>	20 min/1.1 hrs	7471 or 7469	Is designed for the bonding of cylindrical fitting parts, particularly where low viscosity is required. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration.

<b>RTV sealants</b>					
<b>Product</b>	<b>Color</b>	<b>Strength</b>	<b>Fixture/Full Cure (Steel/Steel) Time</b>	<b>Description</b>	
5699	Grey	<b>1.3 – 2.1 MPa (189 – 305 psi)</b>	30 min/14 days	Is designed primarily for flange sealing with excellent oil resistance on rigid flange sealing for example on transmissions and cast metal housings.	
587	Blue	NA	2 hrs/24 hrs	Forms tough, flexible gaskets directly on the flange. Sensor-safe, low odor, non-corrosive. Excellent oil resistance and joint movement values. Eight times more flexible than cork/composite gaskets; three times more oil resistant than conventional silicones. Temperature range <b>-59 – 260 °C (-75 – 500 °F)</b> intermittent; resists auto and shop fluids.	
593	Black	<b>1.5 MPa (218 psi)</b>	5 min/24 hrs	Is designed for superior bonding and sealing properties to most surfaces (not recommended for concrete). This product resists aging, weathering and thermal cycling without hardening, shrinking or cracking. It is formulated to withstand extreme temperature cycling, UV light and ozone. The thixotropic nature reduces the migration of liquid product after application to the substrate.	

INTRODUCTION

<b>RTV sealants</b>				
<b>Product</b>	<b>Color</b>	<b>Strength</b>	<b>Fixture/Full Cure (Steel/Steel) Time</b>	<b>Description</b>
595	Clear	<b>1.5 MPa (218 psi)</b>	5 min/24 hrs	Is designed for superior bonding and sealing properties to most surfaces (not recommended for concrete). This product resists aging, weathering and thermal cycling without hardening, shrinking or cracking. It is formulated to withstand extreme temperature cycling, UV light and ozone. The thixotropic nature reduces the migration of liquid product after application to the substrate.
596	Red	NA	5 min/24 hrs	Is specifically formulated for gasketing and sealing where high temperatures <b>315 °C (600 °F)</b> are experienced such as exhaust manifolds - crossovers, high temperature ovens and furnaces. Applications where sealing and bonding are required under frequent exposure to temperatures above <b>235 – 315 °C (450 – 600 °F)</b> .

<b>Gasket sealants</b>					
<b>Product</b>	<b>Color</b>	<b>Strength</b>	<b>Fixture/Full Cure (Steel/Steel) Time</b>	<b>Recommended Primer or Activator</b>	<b>Description</b>
509	Blue to greenish paste	<b>8 – 9 MPa (1160 – 1305 psi)</b>	1 hr/72 hrs	7471 or 7469	Provides resistance to low pressures immediately after assembly of flanges. It seals close fitting joints between rigid metal faces and flanges. Typically used as a form-in-place gasket on rigid flanged connections, e.g. gearbox and engine casings, etc. The thixotropic nature reduces the migration of liquid product after application to the substrate.
515	Opaque, dark purple	<b>6 – 14 MPa (870 – 2031 psi)</b>	30 min/18 hrs	7471 or 7469	It seals close fitting joints between rigid metal faces and flanges and will flex with minor flange movements. Provides resistance to low pressures immediately after assembly of flanges. Typically used as a form-in-place gasket for pumps, thermostats, compressors, transmission housings and axle covers.
518	Red	<b>7.5 – 8.5 MPa (1088 – 1233 psi)</b>	30 min/8 hrs	7471 or 7469	Typical applications include sealing close fitting joints between rigid metal faces and flanges. Provides resistance to low pressures immediately after assembly of flanges. Typically used as a form-in-place gasket on rigid flanged connections, e.g. gearbox and engine casings, etc.
542	Brown	<b>9 – 25 Nm (80 – 222 lb in)</b>	20 min/8 hrs	7471 or 7469	Is designed for the locking and sealing of metal pipes and fittings. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration.
545	Purple	<b>2 Nm (20 lb in)</b>	30 min/24 hrs	7471 or 7469	Is designed for the locking and sealing of metal pipes and fittings. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. This product is specially formulated to offer lubricity for easy assembly.
567	Off white	<b>0.3 – 1.7 Nm (3 – 15 lb in)</b>	4 hrs/72 hrs	7471 or 7469	Is designed for the locking and sealing of metal tapered threads and fittings.
569	Brown	<b>1.1 – 2.8 Nm (10 – 25 lb in)</b>	2 hr/24 hrs	7471 or 7469	Is designed for the locking and sealing of plastic and metal pipes and fittings.

Gasket sealants					
Product	Color	Strength	Fixture/Full Cure (Steel/Steel) Time	Recommended Primer or Activator	Description
592	White	<b>0.113 – 0.330 Nm (1 – 3 lb in)</b>	72 hrs	none	Is a medium strength anaerobic sealant with Teflon® for tapered pipe threads. The high lubricating properties of this compound prevent galling on pipe threads and fittings. It will provide immediate low pressure sealing and allow the readjustment of fittings shortly after assembly. After 72 hours the joint is sealed to pipe burst pressure.
598	Metallic black	<b>1.31 MPa (190 psi)</b>	25 min/72 hrs	none	This product resists aging, weathering and thermal cycling without hardening, shrinking or cracking. Typical applications include oil pans, transmission pans, valve covers, valves and guides, timing gear covers, and differential covers. This product is typically used in applications with an operating range of <b>-54 – 260 °C (-65 – 500 °F)</b> .

Thread locker and sealing					
Product	Color	Strength	Fixture/Full Cure (Steel/Steel) Time	Recommended Primer or Activator	Description
204	Pink	<b>12.4 – 24.9 Nm (110 – 220 lb in)</b>	10 min/72 hrs	none	Is a dry-to-the-touch, preapplied film for threaded fasteners. It remains inert on the fastener until assembly of the threads releases a quick curing resin. The resin fills all the voids in the threads and cures to securely lock and seal the assembly.
222	Purple	<b>4 – 14 Nm (35 – 124 lb in)</b>	20 min/3 hrs	7471 or 7469	Is designed for the locking and sealing of threaded fasteners which require easy disassembly with standard hand tools.
242	Blue	<b>5.6 – 17 Nm (50 – 150 lb in)</b>	3 min/6 hrs	7471 or 7469	Is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools.
243	Blue	<b>7 – 24 Nm (62 – 212 lb in)</b>	10 min/1 hr	7471 or 7469	Is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools.
246	Blue	<b>2 – 5.7 Nm (18 – 50 lb in)</b>	10 min/6 hrs	7471 or 7469	Is designed for the locking and sealing of threaded fasteners which require normal disassembly with standard hand tools. The product cures when confined in the absence of air between close fitting metal surfaces and prevents loosening and leakage from shock and vibration. Particularly suitable for heavy duty applications such as bolts used in transmissions, construction equipment or railroad assemblies where resistance to heavy shock, vibration and stress level is required along with exposure to elevated temperatures.
262	Red	<b>22 – 40 Nm (195 – 354 lb in)</b>	15min/7 hrs	7471 or 7469	Is designed for the permanent locking and sealing of threaded fasteners.
271	Red	<b>16.9 – 34 Nm (150 – 300 lb in)</b>	10 min/24 hrs	7471 or 7469	Is designed for the permanent locking and sealing of threaded fasteners.
277	Red	<b>32 – 40 Nm (283 – 354 lb in)</b>	30 min/7 hrs	7471 or 7469	Is designed for the permanent locking and sealing of threaded fasteners.