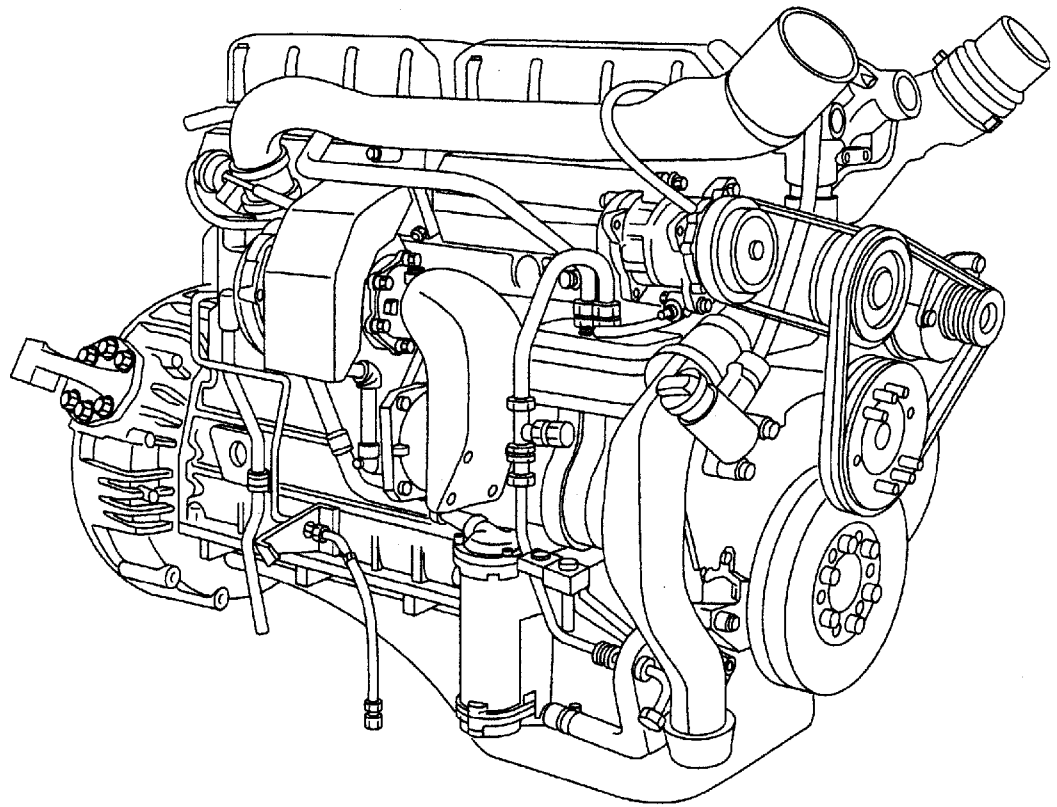


Component manual

XF engine



© 0005 DAF Trucks N.V., Eindhoven, The Netherlands.

In the interest of continuing product development, DAF reserves the right to change specifications or products at any time without prior notice.

No part of this publication may be reproduced and/or published by printing, photocopying, on microfilm or in any manner whatsoever without the prior written consent of DAF Trucks N.V.

SAFETY PRECAUTIONS

Warning symbol

When text is accompanied by the warning symbol shown here, this indicates that the information provided is essential for the health and personal safety of the mechanic.

In addition, this warning symbol is also shown if there are conditions in which damage can be caused to the component or parts thereof.



Safety precautions

To ensure that the mechanic's health is not endangered, the following safety instructions must be strictly observed.

M0015

- Comply with all the warnings and safety instructions given in this engine parts catalogue. First read the instructions and warnings on the labels and stickers which are affixed to various components on the vehicle and follow them! They have been put there for your health and safety, so do not ignore them!
- Wear clean, fitted clothes and apply protective cream to unprotected parts of your body, if necessary.
- Ensure proper extraction of dangerous materials from the work area.
- Maintain a safe distance from rotating and/or moving parts.
- Avoid unnecessary contact with drained oil. Frequent contact damages the skin.
- Various sorts of oil and other lubricants used on the vehicle may constitute a health hazard. So avoid both inhaling and direct contact.
- Exercise caution when working with springs under pressure. Inadvertently released springs may cause serious injuries. Small springs and circlips may also cause injuries when inadvertently released (wear goggles).

SAFETY PRECAUTIONS

- If necessary, support the component suitably.
- Always use the appropriate lifting gear (gearbox jack) or approved lifting gear or hoists for the removal and installation of heavy components. Attach the component securely to the lifting or hoisting gear.
- After a fire it is possible that hazardous residues may remain from the plastics used in some oil seals and sealing rings. Wear protective, acid-resistant clothing and PVC gloves when removing such fire residues. Submerge such fire residues in, or sprinkle them amply with, a calcium hydroxide solution (slaked lime and water). Thoroughly clean the protective clothing after use. Treat the gloves as chemical waste.

TECHNICAL DATA	0
DIAGNOSIS	1
CONSTRUCTION PARTS	2
FUEL SYSTEM	3
COOLING SYSTEM	4
TIMING GEAR	5
FLYWHEEL AND FLYWHEEL HOUSING	6
CYLINDER HEAD	7
LUBRICATION SYSTEM	8
CYLINDER BLOCK AND DRIVING GEAR	9

CONTENTS

	Page	Date
1. ENGINE DATA	1-1	0005
2. THREADED CONNECTIONS	2-1	0005
2.1 Dipped bolts	2-1	0005
2.2 Locking and sealing compounds	2-3	0005
2.3 Threaded connections	2-6	0005
3. CONSTRUCTION PARTS	3-1	0005
3.1 General	3-1	0005
3.2 Tightening torques	3-3	0005
4. FUEL SYSTEM	4-1	0005
4.1 General	4-1	0005
4.2 Tightening torques	4-2	0005
5. COOLING SYSTEM	5-1	0005
5.1 General	5-1	0005
5.2 Tightening torques	5-2	0005
5.3 Filling capacities	5-2	0005
6. TIMING GEAR	6-1	0005
6.1 General	6-1	0005
6.2 Tightening torques	6-2	0005
7. FLYWHEEL AND FLYWHEEL HOUSING	7-1	0005
7.1 General	7-1	0005
7.2 Tightening torques	7-2	0005
8. CYLINDER HEAD	8-1	0005
8.1 General	8-1	0005
8.2 Tightening torques	8-4	0005
9. LUBRICATION SYSTEM	9-1	0005
9.1 General	9-1	0005
9.2 Tightening torques	9-2	0005
9.3 Filling capacities	9-3	0005
10. CYLINDER BLOCK AND DRIVING GEAR	10-1	0005
10.1 General	10-1	0005
10.2 Tightening torques	10-8	0005



0

1. ENGINE DATA

Types	XF 250 M XF 280 M XF 315 M XF 355 M
Version	Euro 2 (M), water-cooled, four-stroke diesel engine with direct fuel injection, 4 valves per cylinder and turbocharger intercooling.
Number of cylinders	6
Bore x stroke	130 x 158 mm
Swept volume	12.58 litres
Compression ratio	16.0 : 1
Firing order	1-5-3-6-2-4
Weight	approx. 1,049 kg

ENGINE TYPE	IDLE rpm	MAXIMUM UNLOADED rpm
XF 250 M	525 - 575	approx. 2270
XF 280 M	525 - 575	approx. 2300
XF 315 M	525 - 575	approx. 2300
XF 355 M	525 - 575	approx. 2300

ENGINE TYPE	P(kW) at rpm	M (Nm) at rpm
XF 250 M	250 at 2000	1600 at 1200 - 1500
XF 280 M	280 at 2000	1750 at 1100 - 1500
XF 315 M	315 at 2000	1900 at 1050 - 1500
XF 355 M	355 at 2000	2050 at 1000 - 1500



TECHNICAL DATA

Engine data

XF-Engine

0

2. THREADED CONNECTIONS

2.1 DIPPED BOLTS

The components can be provided with threaded connections, which have been treated with lubricating fluid (dipped threaded connection). Factory-galvanised bolts and nuts are wax-dipped. Black annealed and phosphatised bolts and nuts are oil-dipped. The advantage of using dipped nuts and bolts is that friction during tightening is reduced, so that the specified pre-tension can be accurately obtained. The result of this is that the tightening torque can be reduced with the same pre-stressing force.

As this results in a smaller tolerance range of the tightening torques, the specified tightening torques must be adhered to more strictly. So always use a reliable and accurate torque spanner.

Note:

Have torque wrenches regularly inspected and calibrated.

To achieve the correct pre-tension when re-using nuts and bolts, it is important to clean the thread thoroughly. After cleaning, apply one drop of lubricant to the first turn of the screw thread and one drop to the bearing surface of the nut or bolt. Only use engine oil as a lubricant for reused bolts and nuts. Lubricants other than engine oil and factory-applied grease must not be used under any circumstances.

The reason for this is that the friction coefficients of other lubricants vary too much and are not the same as those of the above-mentioned lubricants.

The use of locking compounds in combination with dipped bolts and nuts creates no problems.

0

The following applies to all threaded connections (for both new and used vehicles):

- in the case of standard connections, apply the lubricant before fitting, and tighten/retorque in accordance with the standard for dipped bolts:
- in the case of special connections, apply the lubricant before fitting, and tighten/retorque in accordance with the values specified in the instructions.

The instructions for using a lubricant also apply to new bolts supplied from the warehouse. Dry threaded connections are no longer permitted because of their highly variable friction coefficients.

2.2 LOCKING AND SEALING COMPOUNDS



Certain cleaning agents have a negative effect on the functioning of locking compounds. The general rule is therefore that fasteners and components which have been cleaned with a cleaning agent must be treated with a cleaning liquid to ensure that the locking compound functions properly.



OVERVIEW LOCKING COMPOUNDS			
Product name	Properties	Applications	DAF number
Loctite activator 7063	<ul style="list-style-type: none"> - Cleans and degreases - Non-inflammable and not corrosive 	For cleaning/de-greasing of materials to which a locking compound must be applied	1322827
Loctite activator 7063	<ul style="list-style-type: none"> - Cleans and degreases - Non-inflammable and not corrosive 	For cleaning/de-greasing of materials to which a locking compound must be applied	1322827
Loctite 243	<ul style="list-style-type: none"> - Locking with an average detaching strength - Detachable with normal tools 	For locking threaded screw connections	0068197
Loctite 2701	<ul style="list-style-type: none"> - Locking with a high detaching strength - Repairs the fit in bearing housings - Seals against leaks - Difficult to detach 	Locking of threaded connections, gear lever bearing, freeze plugs	1340646
Loctite 638	<ul style="list-style-type: none"> - Locking with a high detaching strength under dynamic load - Difficult to detach 	Locking of cylindrical connections	0645557
Loctite 262	<ul style="list-style-type: none"> - Locking with a high detaching strength - Difficult to detach 	Locking of threaded connections, such as the pinion nut	1279841

TECHNICAL DATA

Threaded connections

XF-Engine

0

OVERVIEW LOCKING COMPOUNDS			
Product name	Properties	Applications	DAF number
Dirko D	<ul style="list-style-type: none">- Temperature-resistant to 180°C- Resistant to oil, coolant	<ul style="list-style-type: none">- For sealing surface connections	1345014
Loctite 510	<ul style="list-style-type: none">- Temperature-resistant to 200°C- Resistant to oil, brake fluid, coolant	<ul style="list-style-type: none">- For sealing surface (flange) connections that are subjected to high operating temperatures, such as the flywheel housing	0697149
Loctite 574	<ul style="list-style-type: none">- Resistant to high pressures (up to 350 bar)- Resistant to oil, brake fluid, coolant	<ul style="list-style-type: none">- For sealing surface connections against high pressures	1246867
Loctite Blue	<ul style="list-style-type: none">- Temperature-resistant from 60 to 260°C- Resistant to oil	<ul style="list-style-type: none">- For sealing flexible constructions such as (valve) covers	1242895
Loctite ultra grey	<ul style="list-style-type: none">- Silicone sealant, good resistance to coolant- Temperature-resistant to 325°C	<ul style="list-style-type: none">- For sealing (surface) connections in the cooling system	1284123
Silicon rubber		<ul style="list-style-type: none">- For protecting against moisture penetration in (floor) connectors	1340644
Loctite ultra copper	<ul style="list-style-type: none">- Silicone sealant, good resistance to oil- Temperature-resistant to 350°C	<ul style="list-style-type: none">- For sealing surface connections such as hub covers	1284122
Dow Corning 732	<ul style="list-style-type: none">- Silicone sealant, good resistance to oil- Elastic to -50°C and +220°C- Vulcanises to a tough rubber at room temperature	<ul style="list-style-type: none">- Sealing of surface connections such as the front and rear gear box covers	0693628
Loctite 572	<ul style="list-style-type: none">- Seals against low pressure immediately after fitting	<ul style="list-style-type: none">- Threaded connections	0292336



OTHER PRODUCTS			
Product name	Properties	Applications	DAF number
Molykote BR 2 PLUS	<ul style="list-style-type: none"> - Lubricating grease is heat-resistant from -30°C to +130°C - Water-resistant 	<ul style="list-style-type: none"> - Everywhere where lubrication is appropriate and normal - For almost all ball and roller bearings, slide bearings, guides, couplings, spline-shafts, threaded spindles, small sprocket drives with a low speed 	1389512
Tectyl	<ul style="list-style-type: none"> - Protects the hollow areas of the superstructure against corrosion 	<ul style="list-style-type: none"> - For post-treatment of cab parts to protect against corrosion Can also be used as protection for metal parts 	1343888
Copaslip	<ul style="list-style-type: none"> - Copper paste with an excellent bond, is anti-corrosive and heat-resistant from -35 to 1100°C - Resistant to water, salts and acids - Prevents wear, oxidation, rust, corroding and locking of metal surfaces 	<ul style="list-style-type: none"> - For connections that are vulnerable to oxidation or corrosion, such as battery terminals, exhaust couplings etc. 	1284344

Installation, locking compound

1. Clean both the internal and external thread.
2. De-grease the thread with a suitable de-greasing agent which leaves no residue that could affect proper functioning.
3. Depending on the diameter, apply one or more drops of locking compound. Never dip the bolt or stud into the locking compound.

0

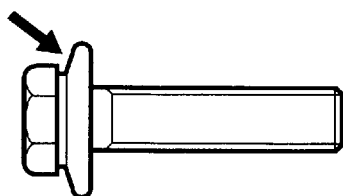
4. Apply a drop of oil under the bolt head. Locking compounds also reduce the frictional resistance, which means that applying a drop of oil to the thread is **not** required.
5. Tighten the connection to the specified torque.

2.3 THREADED CONNECTIONS

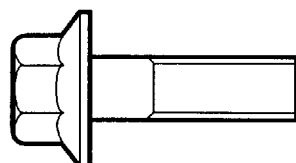
TABLE OF STANDARD TIGHTENING TORQUES, DAF STANDARD 00804-203

The tightening torques in the table below are standard torques and only apply to dipped threaded connections.

The property-class code is stamped on the nut or bolt, except on the clamping flange bolt. The clamping flange bolt is recognised by a constriction between the hexagonal bolt head and the flange. This constriction is absent in standard flange bolts.



Clamping flange bolt



Standard flange bolt

M2 00 001

**TIGHTENING TORQUES FOR DIPPED
THREADED CONNECTIONS (Nm)**

Overview of tightening torques - applies to:

- property class bolt 8.8/nut 8
- property class bolt 12.9/nut 12
- clamping flange bolt, property class 12.9/nut 12

Property class bolt 8.8/nut 8

M4	:	2.8	± 0.2
M5	:	5.5	± 0.4
M6	:	9.6	± 0.7
M8	:	23	± 2
M10	:	46	± 4
M12	:	79	± 6
M14	:	125	± 9
M16	:	195	± 14
M18	:	280	± 20
M20	:	395	± 30
M22	:	540	± 40
M24	:	680	± 50
M27	:	1000	± 70
M30	:	1350	± 100

Property class bolt 12.9/nut 12

M8	:	32	± 3
M10	:	67	± 5
M12	:	113	± 9
M14	:	178	± 14
M16	:	274	± 22
M18	:	385	± 30
M20	:	550	± 43
M22	:	740	± 60
M24	:	925	± 72
M27	:	1370	± 110

**Clamping flange bolt
property class bolt 12.9/nut 12**

M12	:	178	± 14
M14	:	274	± 22
M16	:	425	± 35
M18	:	550	± 45

Tightening torques for banjo bolts

M6	:	8	± 0.8 Nm
M8	:	15	± 1.5 Nm
M10	:	30	± 3 Nm
M12	:	40	± 4 Nm
M14	:	50	± 5 Nm
M16	:	60	± 6 Nm
M18	:	70	± 7 Nm



TECHNICAL DATA

Threaded connections

XF-Engine

Overview of tightening torques - applies to:

- property class bolt 10.9/nut 10

0

Property class 10.9					
Thread pitch	Tightening torque (Nm)	Extra angular displacement ($\pm 10\%$) for bolt stem length (mm)			
		L \leq 40	41 - 80	81 - 130	131 - 180
M8	30 \pm 2	angular displacement not permitted			
M10	60 \pm 4	angular displacement not permitted			
M12 x 1.75	110 \pm 8	30°	60°	90°	120°
M12 x 1.25	110 \pm 8	45°	90°	120°	150°
M14 x 2	170 \pm 15	30°	60°	90°	120°
M14 x 1.5	170 \pm 15	45°	90°	120°	150°
M14 x 2	for brake back plates: 170 \pm 15 + 60°				
M16 x 2	260 \pm 20	30°	60°	90°	120°
M16 x 1.5	260 \pm 20	45°	90°	120°	150°
M18 x 1.5	360 \pm 30	45°	90°	120°	150°
M20 x 1.5	520 \pm 40	45°	90°	120°	
M22 x 2.5	for steering and track rods: 500 \pm 50 + 90°				

The bolt stem length L is the length of the bolt between the bolt head and the nut.

If a component is attached with several bolts, all bolts must first be tightened to the specified torque, and subsequently by the angular displacement.