



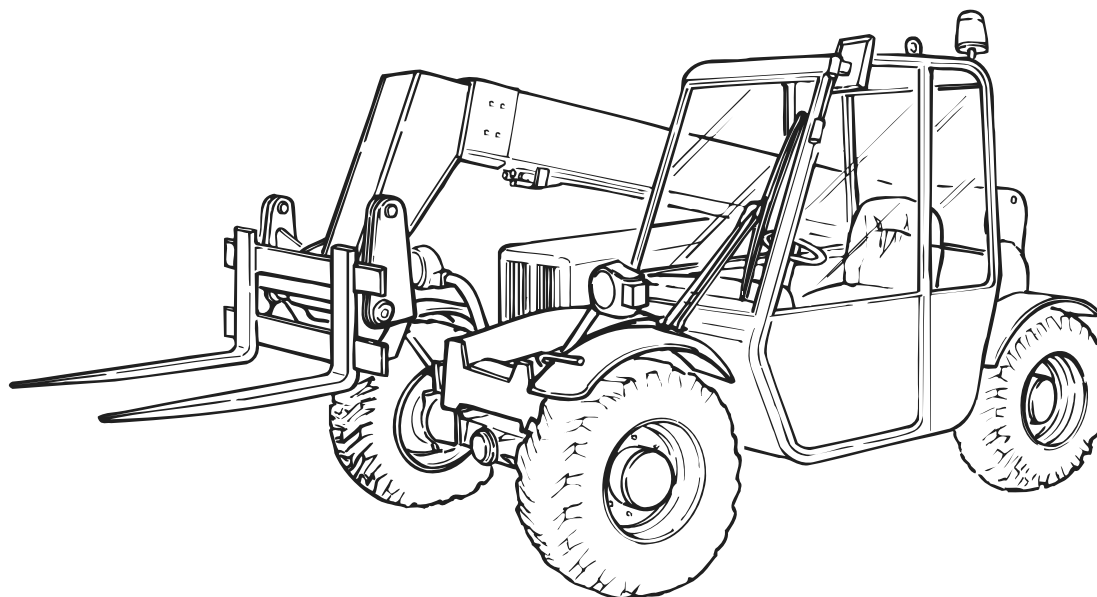
**TEREXLIFT** s.r.l.

**WORKSHOP  
MANUAL**

Code 57.4400.3200 - 1<sup>st</sup> Edition 09/2002

*Handler with telescopic boom*

**TELELIFT 2306**



**English**

Edition

**INDEX**

*This Workshop manual has been drawn up thanks to the collaboration of all the staff of TEREXLIFT Technical Assistance office, in the person of Mr. **Biccheri Giuseppe**, Mr. **Sassofrasso Ivano**, Mr. **Dolfi Enrico**, Mrs. **Longino Rossana**, Mrs. **Forlucci Monica** and of Mr. **Ceccagnoli Romolo** of TEREXLIFT Technical Office.*

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# Section A

## GENERAL INFORMATION

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**A.01 INTRODUCTION**

This manual has been prepared to provide information about the routine and extraordinary maintenance of the main units of the machine in a safe and proper way.

**STRICTLY COMPLY WITH THE INSTRUCTIONS  
GIVEN IN THIS MANUAL!  
READ AND UNDERSTAND THIS MANUAL  
BEFORE CARRYING OUT ANY INTERVENTION  
ON THE MACHINE.**

*If you are unsure about anything after the reading of this manual, address to TEREXLIFT Assistance Service: addresses, phone and fax numbers are printed in the cover and in the title-page of this manual.*

Keep this manual in the workshop at all times and read it before carrying out any extraordinary maintenance job.



**A.02 SYMBOLS USED IN THE MANUAL**

In this manual, any important information starts with a **SPECIAL SYMBOL**.

Symbols are also used to direct the reader's attention to special technical information about the tools to use, the tightening torques, etc.

There are six safety symbols in this manual, always combined with keywords that class the situations according to their degree of dangerousness.

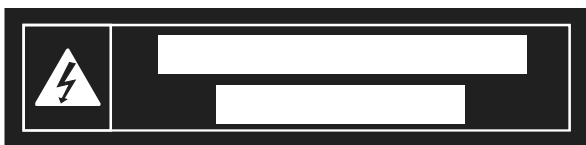
The symbols are always followed by a text explaining the situation taken into account, the attention to be paid to such situation, the method and the behaviour to be adopted. If necessary, it stresses prohibitions or provides instructions to prevent dangers.

Sometimes, it can be followed by illustrations.

The safety symbols are the following:



*Draws the attention to situations that involve your own as well as the others' safety and that can result in serious or lethal injury.*



*Draws the attention to electrical risks that involve your own as well as the others' safety and that can result in serious injury or lethal injury.*



*Draws the attention either to situations that involve your own as well as the others' safety and that can result in minor or moderate injury; or to situations that affect the machine efficiency.*



*Draws the attention either to situations that involve your own as well as the others' safety and that can result in minor or moderate injury; or to situations that affect the machine efficiency.*



*Draws the attention to important technical information or practical advice that allows for a safer and more efficient use of the machine.*



*Draws the attention to important environment-related information.*



*Indicates the number of people needed for the job*



*Time expected to do the intervention (except in case of troubles)*



*Special tools needed for the job*



*Weight of the unit to be handled*



*Tightening torque of bolts and screws*



*Inspection needed*

**A.03 ABBREVIATIONS**

Abbreviation	Definition
Tab.	Table
Pag.	Page
Sect.	Section
Dwg.	Drawing
Ref.	Reference
CLS	Concrete
Mach.	Machine
Fig.	Figure
Ph.	Photo
T.O.	Technical Office
T.A.S.	Technical Assistance Service

**A.04 UNITS OF MEASURE**

**1 FORCE**

The unit of measure of force is the Newton (N)

For the conversion:

1 N = 0.1019 kg

1 kg = 9.81 N

**2 POWER**

The unit of measure of power is the kilowatt (kW). Other units of measure used are:

CV Horsepower

HP Horsepower

For the conversion:

1 kW = 1.36 CV

1 kW = 1.34 HP

1 CV = 0.736 kW

1 CV = 0.986 HP

1 HP = 0.746 kW

1 HP = 1.014 CV

**3 TORQUE**

The unit of measure of power is the Newton metre (Nm).

For the conversion:

1 Nm = 0.1019 kgm

1 kgm = 9.81 Nm

**1 kgm = 10 Nm**

**NOTE:**

For simplicity, the **Nm** unit is converted according to the ratio 10 Nm = 1 kgm

**4 SPECIFIC CONSUMPTION**

The specific consumption is expressed in g/kWh (grams per kilowatt-hour). Another unit of measure used is: g/HPh (grams per horsepower-hour)

For the conversion:

1 g/kWh = 0.736 g/HPh

1 g/HPh = 1.36 g/kWh

**5 PRESSURE**

The unit of measure of pressure is the kPa (kilopascal). Other units of measure used are:

kg/cm<sup>2</sup> kilogram per square centimetre

Atm Technical atmosphere

psi Pound per square inch

For the conversion:

1 kg/cm<sup>2</sup> = 1 Atm

1 kg/cm<sup>2</sup> = 98.1 kPa

1 kg/cm<sup>2</sup> = 0.981 bar

**1 kg/cm<sup>2</sup> = 1 bar**

1 kg/cm<sup>2</sup> = 14.22 psi

1 bar = 100 kPa

1 bar = 1.02 kg/cm<sup>2</sup>

1 bar = 14.51 psi

1 psi = 6.9 kPa

1 psi = 0.069 bar

1 psi = 0.0703 kg/cm<sup>2</sup>

1 kPa = 0.145 psi

1 kPa = 0.0102 kg/cm<sup>2</sup>

1 kPa = 0.01 bar

**NOTE:**

For simplicity, the **bar** unit is converted according to the ratio 1 bar = 1 kg/cm<sup>2</sup>

**6 CONVERSION OF SOME METRIC UNITS OF MEASURE INTO IMPERIAL UNITS OF MEASURE**

0.1 mm = 3.937 mils

1 mm = 0.039 inch

1 m = 3.281 ft

1 km = 0.621 miles

1 cm<sup>3</sup> = 0.061 cu. in.

1 g = 0.035 oz.

1 kg = 2.205 lbs.

1 t = 1.102 short ton

1 t = 0.9842 long ton

0°C = 32°F

Note: in case of differences of temperature 1°C = 1.8°F

**A.05 MINIMUM WORKSHOP EQUIPMENT**

*The list below indicates the minimum equipment necessary for servicing the vehicle.*

**Standard tools**

- 6 to 41 mm box wrench set
- 6 to 41 mm socket wrench set
- 2 to 10 mm Allen wrench set
- External circlip pliers -  $\varnothing$  10÷60 mm
- Internal circlip pliers -  $\varnothing$  20÷200 mm
- Two-leg pullers -  $\varnothing$  25÷200 mm
- Three-leg pullers -  $\varnothing$  50÷400 mm
- American cutters
- Scissors
- Screwdriver set
- Hammer set
- Mallets with plastic plugs
- Combination pliers
- Wire nippers
- Nylon collar pliers
- Wire cutter
- Wire strippers
- Shears
- Cutting nippers
- Hand-saw
- Cutter
- Slotted screw driver set -  $\varnothing$  2.5 ÷ 10 mm
- Crosshead screw driver set -  $\varnothing$  2.5 ÷ 10 mm
- Adjustable self-locking pliers
- Ring nut spanner
- Wrench set for hydraulic cylinders
- Drift bolt set
- Chisel set
- Punch
- Funnel
- Funnel with flexible extension
- Calibrated measuring beaker
- Crowbar
- Fluid collecting tanks
- Pliers for internal cylinder seals

**Fittings for plugging disconnected pipes**

- 1/4" gas male plug
- 3/8" gas male plug
- 1/2" gas male plug
- 1" gas male plug
- 1" 1/4 gas male plug
- 1" 1/2 gas male plug
- 1/4" gas female plug
- 3/8" gas female plug

- 1/2" gas female plug
- 1" gas female plug
- 1" 1/4 gas female plug
- 1" 1/2 gas female plug

**Sealing material**

- Teflon tape
- Loctite sealant
- Loctite threadlocker

**Equipment and instrumentation**

- Measure instruments: metre, gauge, micrometres
- Compressor with compressed air system
- Hydraulic circuit test bench for pressures up to 400 bar
- Pressure gauges 0-60 bar / 0-240 bar / 0-600 bar
- Ammeter
- Digital tester
- Hourmeter
- Hydrometer for checking the battery charge
- Thermometer for oil temperature check
- Lamp/indicator for checking hydraulic circuit leaks
- Painting system
- Steam cleaner
- Forklift and/or pallet lift
- Stackable wooden planks and/or pallets
- Electric welding machine
- Cylinder and blowpipe
- Hoisting means with 5000 kg payload
- Textile bridles
- Two-/three-leg chains with hooks
- Pneumatic screwdriver
- Water level
- Bench drilling machine
- Portable electric drill
- Set of helical bits
- Set of screw taps and threaders
- Battery charger
- Adjustable stands





**Consumable material**





- Oils
- Greases
- Rags for cleaning

**Personal protection equipment**



- Goggles
- Gloves
- Ear-protectors
- Shoes
- Overall





**A.06 SPECIAL EQUIPMENT**

	<b>PART#</b>	<b>DESCRIPTION</b>
		<p>Pressure gauge for checking the hydraulic oil low pressure - 0÷60 bar</p> <p>Pressure gauge for checking the hydraulic oil medium pressure 0÷240 bar</p> <p>Pressure gauge for checking the hydraulic oil high pressure 0÷600 bar</p>
		<p>Amperometric detector</p>
		<p>Electronic hourmeter</p>
		<p>Tester for electric values</p>

	<b>PART#</b>	<b>DESCRIPTION</b>
		Clock / chronometer
		Hydrometer for battery charge
		Lamp/indicator for hydraulic circuit leaks
		Lamp/indicator for electric circuit

**A.07 TIGHTENING TORQUES**

Thread diameter <i>mm</i>	Pitch <i>mm</i>	Wrench measure <i>mm</i>				Tightening torques <i>Material class</i>					
					8.8		10.9		12.9		
			UNI 5931/32	UNI 5933+36	UNI 5923+30	Normal Nm	Zinc plated Nm	Normal Nm	Zinc plated Nm	Normal Nm	Zinc plated Nm
4	0.7	7	3	2.5	2	3.2	2.8	4.4	3.9	5.3	4.8
5	0.8	8	4	3	2.5	6.1	5.5	8.7	7.8	10.3	9.3
6	1	10	5	4	3	10.6	9.5	14.8	13.3	17.8	16.0
8	1.25	13	6	5	4	25.1	22.5	35.4	31.8	42.5	30.2
	1	13	6	5	4	26.5	23.8	37.3	33.5	44.7	40.3
10	1.5	17	8	6	5	51.1	46.0	71.9	64.7	86.3	77.6
	1.25	17	8	6	5	53.4	48.1	75.1	67.5	90.2	81.1
12	1.75	19	10	8	6	86.5	77.8	121.4	109.2	145.9	131.3
	1.25	19	10	8	6	92.4	83.2	129.5	116.6	156.1	140.5
14	2	22	12	10	6	137.7	123.9	193.8	174.4	232.6	209.3
	1.5	22	12	10	6	145.9	131.3	206.1	185.5	246.9	222.0
16	2	24	14	10	8	209.1	188.2	293.8	264.4	353.0	317.7
	1.5	24	14	10	8	218.3	196.5	308.1	277.3	369.3	332.4
18	2.5	27	14	12	8	288.7	259.8	406.1	365.5	487.7	436.9
	1.5	27	14	12	8	314.2	282.8	442.8	398.5	530.6	477.5
20	2.5	30	17	12	10	408.1	367.3	573.4	516.1	687.7	618.9
	1.5	30	17	12	10	439.7	395.8	619.3	557.4	742.8	662.5
22	2.5	32	17	-	12	542.3	488.5	763.2	686.9	915.3	823.7
	1.5	32	17	-	12	582.6	524.3	819.3	737.4	983.6	885.3
24	3	36	19	-	12	705.1	634.5	990.8	891.7	1193.3	1074.4
	2	36	19	-	12	745.3	671.3	1051.0	945.9	1255.1	1129.5
27	3	41	19	-	-	1036.0	927.5	1448.9	1304.0	1734.6	1561.2
	2	41	19	-	-	1091.8	982.6	1530.6	1377.5	1836.7	1653.0
30	3.5	46	22	-	-	1307.9	1258.1	1989.3	1772.4	2357.1	2121.4
	2	46	22	-	-	1510.2	1359.1	2122.4	1910.2	2540.8	2286.7
33	3.5	50	24	-	-	2000.0	1800.0	2800.0	2520.0	3400.0	3060.0
	2	50	24	-	-	1610.0	1450.0	2300.0	2070.0	2690.0	2420.0
36	4	55	27	-	-	2600.0	2340.0	3700.0	3330.0	4300.0	3870.0
	3	55	27	-	-	2800.0	2520.0	3900.0	3510.0	4600.0	4140.0
39	4	60	27	-	-	3400.0	3060.0	4800.0	4320.0	5600.0	5040.0
	3	60	27	-	-	3600.0	3240.0	5100.0	4590.0	5900.0	5310.0

Thread diameter	Pitch	Standard nuts		Low nuts	
		 Nm	 Nm	 Nm	 Nm
4	0.7	5.5		3.5	
5	0.8	5.5		3.5	
6	1	9.5	13.0	6.0	8.0
8	1.25	23.0	32.0	14.0	20.0
	1	25.0	35.0	16.0	22.0
10	1.5	46.0	64.0	29.0	40.0
	1.25	49.0	68.0	31.0	42.0
12	1.75	80.0	110.0	50.0	69.0
	1.25	88.0	125.0	55.0	78.0
14	2	125.0	180.0	78.0	110.0
	1.5	140.0	195.0	88.0	120.0
16	2	195.0	275.0	120.0	170.0
	1.5	210.0	295.0	130.0	185.0
18	2.5	270.0	390.0	170.0	245.0
	1.5	305.0	425.0	190.0	265.0
20	2.5	305.0	540.0	190.0	340.0
	1.5	425.0	600.0	260.0	375.0
22	2.5	510.0	720.0	320.0	450.0
	1.5	570.0	800.0	360.0	500.0
24	3	660.0	930.0	410.0	580.0
	2	720.0	1000.0	450.0	630.0
27	3	980.0	1400.0	610.0	880.0
	2	1050.0	1500.0	660.0	940.0
30	3.5	1350.0	1850.0	850.0	1160.0
	2	1450.0	2050.0	910.0	1280.0
33	3.5	1650.0	2310.0	1050.0	1470.0
	2	1980.0	2770.0	1270.0	1780.0
36	4	2120.0	2970.0	1360.0	1900.0
	3	2550.0	3570.0	1630.0	2280.0
39	4	2730.0	3820.0	1750.0	2450.0
	3	3250.0	4550.0	2080.0	2910.0



**A.08 DRILL DIAMETERS FOR THREADS**

<i>Thread x pitch</i>	<i>DRILL DIAMETER LIMITS</i>		<i>DRILL BIT DIAMETER</i>
	<i>max</i>	<i>min</i>	
M 4 x 0.7	3.42	3.24	3.30
x 0.5	3.60	3.46	3.50
M 5 x 0.8	4.33	4.13	4.20
x 0.5	4.60	4.46	4.50
M 6 x 1	5.15	4.92	5.00
x 0.75	5.38	5.19	5.20
M 8 x 1.25	6.91	6.65	6.80
x 1	7.15	6.92	7.00
M 10 x 1.5	8.87	8.38	8.50
x 1.25	9.38	9.19	9.20
M 12 x 1.75	10.44	10.10	10.20
x 1.5	10.68	10.38	10.50
M 14 x 2	12.21	11.83	12.00
x 1.5	12.68	12.38	12.50
M 16 x 2	14.21	13.84	14.00
x 1.5	14.68	14.38	14.50
M 18 x 2.5	15.74	15.29	15.50
x 1.5	16.68	16.38	16.50
M 20 x 2.5	17.74	17.29	17.50
x 1.5	18.68	18.38	18.50
M 22 x 2.5	19.74	19.29	19.50
x 1.5	20.68	20.38	20.50
M 24 x 3	21.25	20.75	21.00
x 2	22.21	21.83	22.00
M 27 x 3	24.25	23.75	24.00
x 2	25.21	24.83	25.00
M 30 x 3.5	26.77	26.21	26.50
x 3	27.25	26.75	27.00
M 33 x 3.5	27.77	29.21	29.50
x 2	31.21	30.83	31.00
M 36 x 4	32.27	31.65	32.00
x 3	33.25	32.75	33.00
M 39 x 4	35.27	34.67	35.00
x 3	36.25	35.75	36.00

**A.09 STANDARD TIGHTENING TORQUES FOR FITTING SEALS**
**■ 60° CONICAL SEALS**

Thread diameter		TIGHTENING TORQUES (0+10%) 60° CONICAL SEALS Nm
inc.	mm	
G 1/8"		15
G 1/4"	M 10 x 1	20
9/16"-18		25
11/16"-16		40
13/16"-16		55
3/4"-16		62
1"-14		80
7/8"-14		80
1.1/16"-12		110
1.3/16"-12		115
1.5/16"-12		160
1.7/16"-12		130
1.11/16"-12		190
1.5/8"-12		225
1.7/8"-12		270
2"-12		245
2.1/4"-12		360

**■ FRONT O-LOK (Parker) SEALS**

Thread diameter		TIGHTENING TORQUES FRONT O-LOK (Parker) SEALS Nm
inc.	mm	
9/16"-18		25
11/16"-16		40
13/16"-16		55
1"-14		80
1.3/16"-12		115
1.7/16"-12		130
1.11/16"-12		190
2"-12		245

**■ 37° COUNTER-SUNK CONICAL SEALS (JIC)**

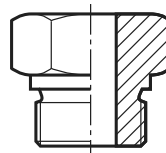
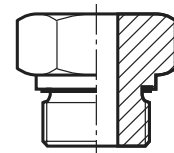
Thread diameter		TIGHTENING TORQUES (0+10%) 37° CONICAL SEALS (JIC) Nm
inc.	mm	
7/16"-20	M10x1	15
1/2"-20	M12x1.5	20
9/16"-18	M14x1.5	28
	M16x1.5	62
3/4"-16	M18x1.5	62
7/8"-14	M22x1.5	80
1.1/16"-12	M27x2	110
1.3/16"-12		141
1.5/16"-12	M33x2	160
1.5/8"-12	M42x2	225
1.7/8"-12	M48x2	270
2.1/4"-12	M10x1	360

**SEALS WITH GRIP-RING**

Thread diameter		Fitting Series	Pipe $\varnothing$ mm	TIGHTENING TORQUE (0+10%) SEALS WITH GRIP-RING Nm
inc.	mm			
G 1/8"	M10x1	LL	4	10
G 1/8"	M10x1	LL	6	10
G 1/8"	M10x1	L	6	25
G 1/4"	M12x1.5	L	8	50
G 1/4"	M14x1.5	L	10	50
G 1/8"	M20x1.5	L	12	130
G 1/8"	M20x1.5	L	15	190
G 1/8"	M20x1.5	L	18	245
G 1/8"	M20x1.5	L	22	130
G 1/8"	M20x1.5	L	28	190
G 1/8"	M20x1.5	L	35	245
G 1/8"	M20x1.5	L	42	245
G 1/4"	M12x1.5	S	6	50
G 1/4"	M14x1.5	S	8	50
G 3/8"	M16x1.5	S	10	80
G 3/8"	M18x1.5	S	12	80
G 1/2"	M22x1.5	S	16	105
G 3/4"	M27x2	S	20	220
G 1"	M33x2	S	25	370
G 1.1/4"	M42x2	S	30	500
G 1.1/2"	M48x2	S	38	600

**FITTING ASSEMBLY**

Thread diameter		TIGHTENING TORQUES (0+10%)	
inc.	mm	JOINTS	
		A Nm	B Nm
G 1/8"	M10x1	25	12
	M12x1.5	30	18
G 1/4"		40	18
	M14x1.5	50	20
	M16x1.5	60	35
G 3/8"	M18x1.5	80	50
		95	40
	M20x1.5	140	60
G 1/2"	M22x1.5	140	75
	M26x1.5	220	85
G 3/4"		250	110
	M27x2	250	100
G 1"		400	190
	M33x2	400	150
G 1.1/4"		600	240
	M42x2	600	260
G 1.1/2"		800	300
	M48x2	800	350


**A**

**B**

**A** Male face  
Mechanical seal or copper washer

**B** Male face  
Soft seal with O-ring

**A.10 LOCKING MATERIAL****THREADLOCKERS**

<i>Product</i>	<i>APPLICATION</i>	<i>Characteristics</i>		<i>Locking speed</i>	<i>Resistance</i>
		<i>Temp. °C</i>	<i>Thread</i>		
Loctite 290	Thread locking	to 150°	M 12	Rapid	Medium
Loctite 222	Thread locking	to 150°	M 20	Moderate	Low
Loctite 243	Thread locking	to 150°	M 20	Rapid	Medium
Loctite 262	Thread locking	to 150°	M 20	Moderate	High
Loctite 270	Thread locking	to 150°	M 20	Moderate	Very high
Loctite 277	Thread locking	to 150°	M 36	Slow	High
Loctite 272	Thread locking	to 200°	M 36	Slow	High

**THREAD SEALANT** *For hermetic sealing. Non suitable for thermoplastic materials*

<i>Product</i>	<i>APPLICATION</i>	<i>Characteristics</i>			<i>Locking speed</i>	<i>Disassembly difficulty</i>
		<i>max °C</i>	<i>Thread max</i>	<i>type</i>		
Loctite 511	Fitting sealant	150°	M80	Con./Cyl.	Rapid	Low
Loctite 542	Fitting sealant	150°	M36	Con./Cyl.	Rapid	Moderate
Loctite 545	Fitting sealant	150°	M36	Con./Con.	Moderate	Low
Loctite 565	Fitting sealant	150°	M80	Con./Cyl.	Instantaneous	Low
Loctite 572	Fitting sealant	150°	M80	Con./Cyl.	Moderate	Low
Loctite 577	Fitting sealant	150°	M80	Con./Cyl.	Rapid	Moderate

**GASKETS** *Total sealing in 24-72 hours*

<i>Product</i>	<i>APPLICATION</i>	<i>Characteristics</i>		<i>Formation time</i>	<i>Resistance to fluids</i>
		<i>max °C</i>	<i>Play max mm</i>		
Loctite 518	Formed-in-place gasket	150°	0,5	Moderate	Excellent
Loctite 509	Formed-in-place gasket	150°	0,2	Moderate	Excellent
Loctite 573	Formed-in-place gasket	150°	0,2	Slow	Excellent
Loctite 574	Formed-in-place gasket	150°	0,5	Rapid	Excellent
Loctite 510	Formed-in-place gasket	200°	0,2	Moderate	Excellent
Loctite 5699	Formed-in-place gasket	200°	6,0	Rapid	Excellent
Loctite 5999	Formed-in-place gasket	200°	6,0	Instantaneous	Excellent
Loctite 5910	Formed-in-place gasket	200°	6,0	Rapid	Excellent
Loctite 5900	Formed-in-place gasket	200°	6,0	Instantaneous	Excellent
Loctite 5920	Formed-in-place gasket	250°	M 36	Slow	Good