

# CYLINDER LINER PROTRUSION SPECIFICATIONS

## CATERPILLAR 3406/C15

	MIN IN	MIN MM	MAX IN	MAX MM	ALLOWABLE VARIATION
PROTRUSION FROM BLOCK	0.001"	0.025mm	0.005"	0.127mm	0.001" (.025mm)

## CUMMINS ISX/QSX

NOTE: "The difference between the lowest cylinder liner and the highest cylinder liner can not be greater than 0.102 mm [0.004 in]. The maximum allowable difference between adjacent cylinders is 0.051 mm [0.002 in]."

	MIN IN	MIN MM	MAX IN	MAX MM	ALLOWABLE VARIATION
PROTRUSION FROM BLOCK	0.007"	0.018mm	0.014"	0.036mm	0.0015" (.0381mm)

## CUMMINS M11/ISM

	MIN IN	MIN MM	MAX IN	MAX MM	ALLOWABLE VARIATION
PROTRUSION FROM BLOCK	0.000"	0.000mm	0.005"	0.127mm	0.001" (.025mm)

## CUMMINS N14

	MIN IN	MIN MM	MAX IN	MAX MM	ALLOWABLE VARIATION
PROTRUSION FROM BLOCK	0.004"	0.1016mm	0.007"	.1778mm	0.001" (.025mm)

## DETROIT DIESEL SERIES 50/60

	MIN IN	MIN MM	MAX IN	MAX MM	ALLOWABLE VARIATION
PROTRUSION FROM BLOCK	-0.0005"	0.0127mm	0.003"	.0762mm	0.002" (.0508mm)

## NAVISTAR DT466E AND DT530E

	MIN IN	MIN MM	MAX IN	MAX MM	ALLOWABLE VARIATION
PROTRUSION FROM BLOCK	0.002"	0.0508mm	0.005"	0.127mm	.001" (0.025mm)

# AFA

INDUSTRIES™

## Heavy Duty Engine Parts

## Head Bolt, Connecting Rod Bolt & Main Bearing Bolt Torque Specifications

Caterpillar® 3406A • 3406B • 3406C • 3406E • C15

Cummins® ISX • ISM11 • N14

Detroit Diesel® Series 60

Navistar® DT466E and DT530E

## Liner Protrusion Specifications

Caterpillar® 3406/C15

Cummins® 1SX/QSX • M11/ISM • N14

Detroit Diesel® Series 50/60

Navistar® DT466E and DT530E



# AFA Q<sup>3</sup> TECHNOLOGY

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# TORQUE SPECIFICATIONS

FOR

• HEAD BOLTS • MAIN BOLTS • ROD BOLTS

## 3406A CATERPILLAR

Rod Bolts	Main Bolts	Head Bolts	
60 +/- 6 lb. ft. then 120° +/- 5°	190 +/- 10 lb. ft. then 120°	200 +/- 20 lb. ft. then 330 +/- 15 lb. ft.	

## 3406B CATERPILLAR

Rod Bolts	Main Bolts	Head Bolts	
60 +/- 6 lb. ft. then 120° +/- 5°	190 +/- 10 lb. ft. then 120°	200 +/- 20 lb. ft. then 330 +/- 15 lb. ft.	

## 3406C CATERPILLAR

Rod Bolts	Main Bolts	Head Bolts	
60 +/- 6 lb. ft. then 120° +/- 5°	190 +/- 10 lb. ft. then 120°	200 +/- 20 lb. ft. then 330 +/- 15 lb. ft.	

## 3406E CATERPILLAR

Rod Bolts	Main Bolts	Head Bolts	
66 +/- 7 lb. ft. then 90° +/- 5°	190 +/- 10 lb. ft. then 120°	200 +/- 11 lb. ft. then 333 +/- 15 lb. ft. then repeat 333 +/- 15 lb. ft.	

## C15 CATERPILLAR

Rod Bolts 4 Bolt	Rod Bolts 2 Bolt	Main Bolts	Head Bolts
52 +/- 3 lb. ft. then 60° +/- 5°	66 +/- 7 lb. ft. then 90° +/- 5°	190 +/- 10 lb. ft. then 120°	200 +/- 11 lb. ft. then 330 +/- 11 lb. ft. then repeat 330 +/- 11 lb. ft.

## ISX CUMMINS

Rod Bolts (New)	Rod Bolts (Used)	Head Bolts	Head Bolts
25-33 ft. lbs. then Loosen then 48-56 ft lbs. then 60° +/- 5°	48-56 ft. lbs. then 60° +/- 5°	110 ft. lbs. then 180°	148 ft. lbs. then 300 ft. lbs. then 90°

## ISM11 CUMMINS

Rod Bolts	Main Bolts (0-35011095)	Main Bolts (35011095-99999999)	Head Bolts	
50 ft. lbs. then 105 ft. lbs. then 155 ft. lbs. then Loosen then Repeat 1-3	50 ft. lbs. then Loosen then 50 ft. lbs. then 180°	50 ft. lbs. then Loosen then 100 ft. lbs. then 180°	50 ft. lbs then 100 ft. lbs. then 180°	

## N14 CUMMINS

Rod Bolts	Main Bolts	"Main Bolts (1" diameter)"	"Main Bolts (3/4" Diameter)"	Head Bolts
95 lb. ft. then 60° +/- 5°	90 lb. ft. then 170 lb. ft. then 255 lb. ft. then Loosen then Repeat 1-3	111 lb. ft. then 210 lb. ft. then 306 lb. ft. then Loosen then Repeat 1-3	89 lb. ft then 170 lb. ft. then 254 lb. ft. then Loosen then Repeat 1-3	100 lb. ft. then 220 ft. lbs. then 90°

## SERIES 60 DETROIT DIESEL

Rod Bolts	Main Bolts	Head Bolts Before Sept 2002	Head Bolts After Sept 2002	
118-137 lb. ft.	347-391 lb. ft	185-210 lb. ft.	220 lb. ft.	

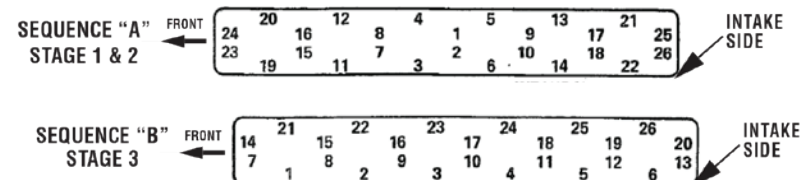
## NAVISTAR DT466E and DT530E

Rod Bolts	Main Bolts	Head Bolts sequence
115 ft. lb.	130 ft. lb.	See Figure 1 Below

**Figure 1**

NOTE 1: Tighten cylinder head bolts following the assembly steps listed:  
1. Lubricate bolt threads, bolt head seating areas and washers with clean engine oil.  
2. Tighten bolts in three (3) stages.

NOTE 2: + - Tighten in steps as shown below.



STAGE 1 - FOLLOWING SEQUENCE "A" TIGHTEN BOLTS TO 110 lbs-ft (150 Nm)  
STAGE 2 - FOLLOWING SEQUENCE "A" TIGHTEN BOLTS TO 155 lbs-ft (210 Nm)  
STAGE 3 - FOLLOWING SEQUENCE "B" TIGHTEN BOLTS, IN ROWS, TO 165 lbs-ft (225 Nm)