



# RENAULT All types

XXX X

10

This note cancels and replaces N.T. 2193 and the values contained in the Workshop Repair Manual

## 10 TIGHTENING THE CYLINDER HEAD BOLTS

- Engine : All Types
- Gearbox : XXX Basic manual : All Workshop Repair Manuals

This Technical Note provides details of special points for tightening all types of cylinder head bolts.

- Reminder :**
- When tightening the cylinder head bolts and in order to obtain correct tightening of the bolts.
  - Extract any oil which may be in the cylinder head securing holes, using a syringe.
  - Lubricate the threads and the bolt heads with engine oil.
  - Wait for a minimum of 3 minutes to settle.
  - The cylinder head is not retightened.

The repair methods given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The methods may be modified as a result of changes by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed".

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ESSENTIAL SPECIAL TOOLING		
Mot.	591 -04	Angular wrench for tightening cylinder head
Mot.	591 -02	Index

ESSENTIAL EQUIPMENT
Socket for Torx 55 cylinder head bolts
Wrench (long) for tightening cylinder head 6 x 8 cross-head bolts
Angular sector for tightening the cylinder head

**Note :**

On the outer packaging of the cylinder head gaskets there is a green label giving the type of gasket (asbestos-free).



ASBESTOS-FREE

(green label)

All engine types except C3 G

Method of tightening

Lubricate the threads and under the bolt heads with engine oil.

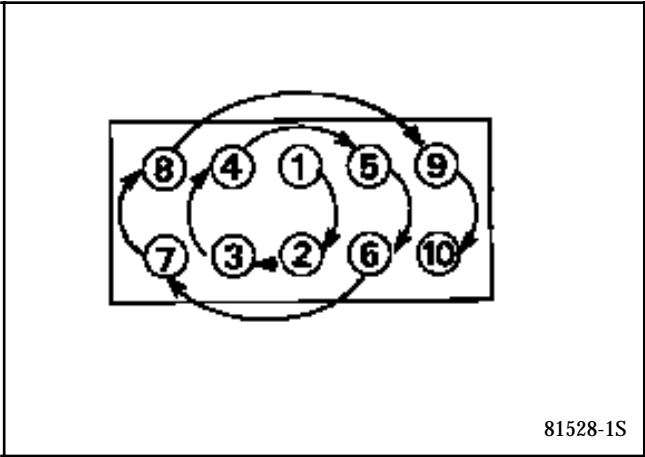
Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening (see table)

Engine type	Tightening torque ( daN.m )
C1G - C3J 688 - C1E 689 - C1C 810 - 847 C2J - C2 H - C2L C1J except turbo	5.5 to 6.5
C1J - turbo	6 to 6.5
840-25 840-26 - C6J	7
C7K 840-30	7.5



Adjusting the valve clearance

Allow the engine to run for 20 minutes.

After the engine has been stopped for 2.5 hours, proceed with tightening of the cylinder head bolts :

- slacken off bolt number 1 by 180° and retighten it to the correct torque;
- carry out the same operation for the other securing bolts, according to the tightening order.

Adjust the valve clearance.

The cylinder head is not retightened.

## C3 G Engine

## Method of tightening

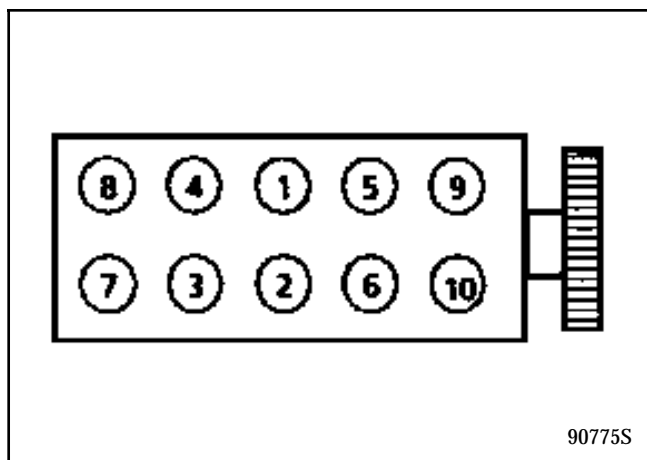
Lubricate the threads and under the bolt heads with engine oil.

## Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening                    **2 daN.m**  
2nd Tightening (angle)         **$90^\circ \pm 4^\circ$**



Wait for a minimum of 3 minutes.

Slacken off each bolt and then :

1st Retightening                **2 daN.m**  
2nd Retightening (angle)       **$90^\circ \pm 4^\circ$**

The cylinder head is not retightened.

## D Engine

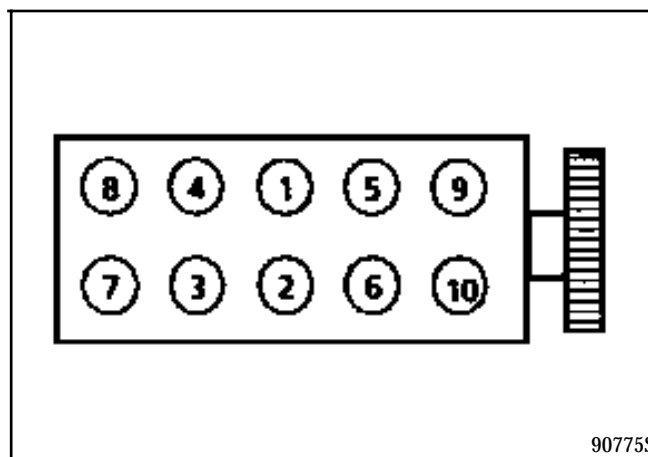
## Method of tightening :

All of the cylinder head bolts must be systematically replaced following dismantling.

Lubricate the threads and under the bolt heads with engine oil.

## Pre-settling the gasket :

- tighten all the bolts to **2 daN.m** then carry out angle tightening  **$90^\circ \pm 6^\circ$**  in the order shown below.



Wait 3 minutes, to allow to settle.

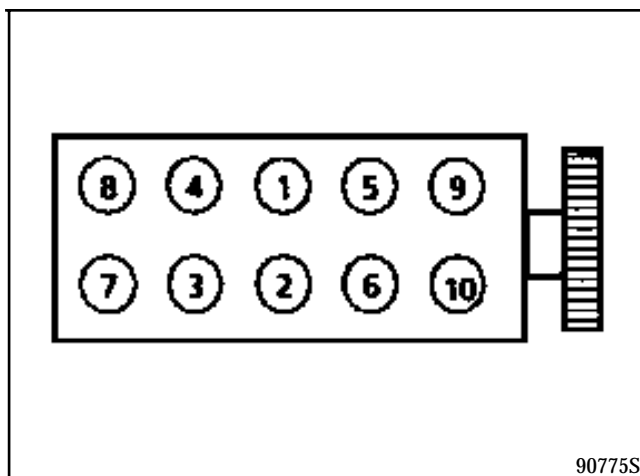
## Tightening the cylinder head bolts.

- slacken the bolts marked (1) and (2) until they are completely free.
- tighten bolts (1) and (2) to **2 daN.m**, then angle tighten of  **$200^\circ \pm 6^\circ$** ,
- slacken the bolts marked (3), (4), (5) and (6) until they are completely free,
- tighten bolts (3), (4), (5) and (6) to **2 daN.m** then angle tighten of  **$200^\circ \pm 6^\circ$** ,
- slacken bolts (7), (8), (9), and (10) until they are completely free,
- tighten bolts (7), (8), (9), and (10) to **2 daN.m** then angle tighten of  **$200^\circ \pm 6^\circ$** ,

### E Engine

#### Method of tightening

All the cylinder head bolts must be systematically replaced following dismantling. Lubricate the threads and under the bolt heads with engine oil.



#### METHOD OF TIGHTENING THE CYLINDER HEAD

##### Pre-settling the gasket

Tighten to **2 daN.m**, then carry out **angular tightening of  $100^\circ \pm 6^\circ$**  in the recommended order :

- tighten bolts 1-2,
- tighten bolts 3-4-5-6,
- tighten bolts 7-8-9-10.

##### Settling the gasket

Wait for 3 minutes to allow the gasket to settle.

##### Tightening

- Slacken bolts 1-2.  
Retighten bolts 1-2 to **2 daN.m**, then carry out an **angle tightening of  $100^\circ \pm 6^\circ$** .
- Slacken bolts 3-4-5-6.  
Retighten bolts 3-4-5-6 to **2 daN.m**, then carry out an **angle tightening of  $100^\circ \pm 6^\circ$** .
- Slacken bolts 7-8-9-10.  
Retighten bolts 7-8-9-10 to **2 daN.m**, then carry out an **angle tightening of  $100^\circ \pm 6^\circ$** .

The cylinder head is not retightened.

**F Engine (Diesel)****Method of tightening :**

All of the cylinder head bolts must be systematically replaced following dismantling.

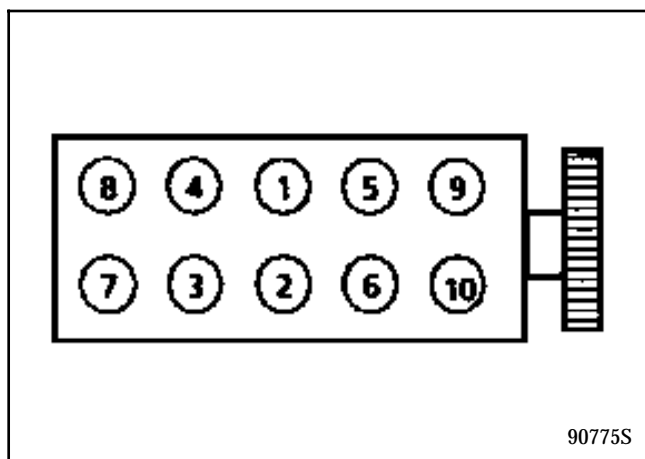
Lubricate the threads and under the bolt heads with engine oil.

**Reminder :**

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening	<b>3 daN.m</b>
2nd Tightening (angle)	<b><math>80^{\circ} \pm 4^{\circ}</math></b>



**Wait 3 minutes to allow to settle.**

The cylinder head is tightened in stages; the following procedure is to be applied to bolts :  
**1-2 then 3-4, 5-6, 7-8, and lastly to bolts 9-10.**

Slacken off each bolt until they are free, then carry out :

1st Retightening	<b>2.5 daN.m</b>
2nd Retightening (angle)	<b><math>213^{\circ} \pm 7^{\circ}</math></b>

The cylinder head is not retightened **except for the F8Q Turbo engine which is not equipped with a metal cylinder head gasket.**

- Following engine warm-up (operation of the engine cooling fan).
- Wait for the engine to return to an ambient temperature.
- In the recommended order, carry out an additional angle tightening of  **$120^{\circ} \pm 7^{\circ}$**  of bolts **1-2, 3-4, 5-6, 7-8 and 9-10**.

**F Engine (petrol) (except F7R and F7P)****Method of tightening :**

All of the cylinder head bolts must be systematically replaced following dismantling.

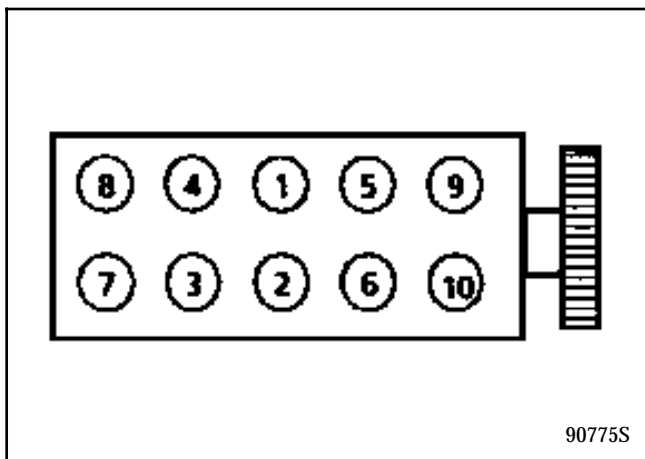
Lubricate the threads and under the bolt heads with engine oil.

**Reminder :**

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening                      **3 daN.m**  
2nd Tightening (angle)         **$80^\circ \pm 4^\circ$**



**Wait for a minimum of 3 minutes.**

The cylinder head is tightened in stages; the following procedure is to be applied to bolts :

**1-2 then 3-4, 5-6, 7-8, and lastly to bolts 9-10.**

Slacken off **each bolt by  $180^\circ$** , then carry out :

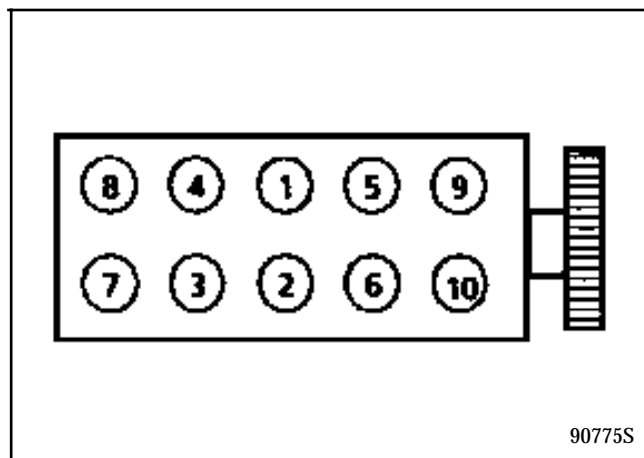
1st Retightening                      **2.5 daN.m**  
2nd Retightening (angle)         **$213^\circ \pm 7^\circ$**

**F7R Engine****Method of tightening :**

Lubricate the threads and under the bolt heads with engine oil.

**1) Pre-settling the gasket :**

- tighten all of the bolts to **3 daN.m** then carry out angle tightening of  **$50^\circ \pm 2^\circ$**  in the order recommended below.



**Wait for a minimum of 3 minutes to allow to settle.**

**2) Tightening the cylinder head bolts:**

- slacken each bolt until they are completely free, then tighten all of the bolts to **2.5 daN.m**, then carry out angle tightening of  **$107^\circ \pm 2^\circ$** .

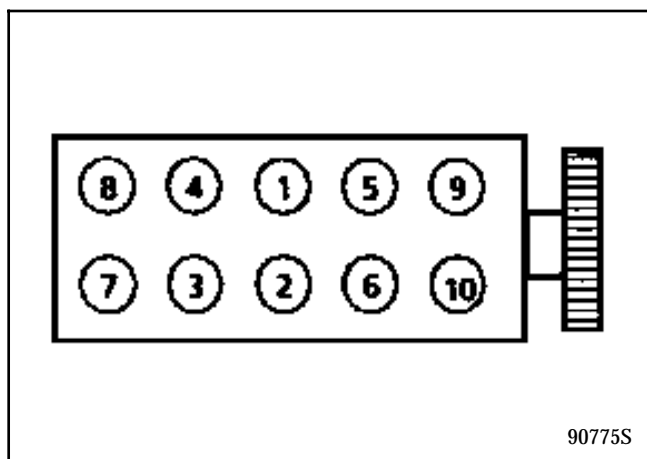
# ENGINE AND LOWER ENGINE ASSEMBLY

## Cylinder head gasket

F Engine (petrol)

### 3) Run the engine until the engine cooling fan cuts in :

- slacken the lower strut mounting bolts (between the air distributor and the cylinder housing).



### 4) Retightening the cylinder head bolts :

- this operation is carried out with the engine cold.
- slacken bolts 1 - 2 until they are completely free.
- retighten bolts 1 - 2 to **2.5 daN.m** then carry out angle tightening of  $107^\circ \pm 2^\circ$
- carry out the same operation for bolts 3 - 4, 5 - 6, 7 - 8 and 9 - 10

### 5) Retighten the strut mounting bolts

### 6) Fit a new cylinder head gasket

The cylinder head is not retightened.

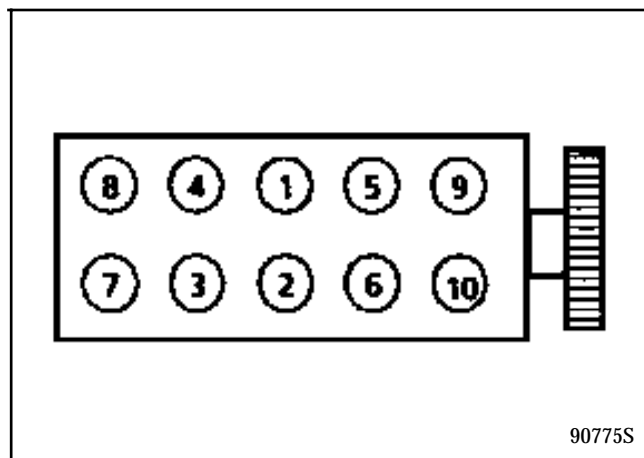
### F7P Engine

### Method of tightening the cylinder head bolts :

Lubricate the new bolts and threads and under the bolt heads with engine oil.

### 1) Pre-settling the gasket :

- tighten all of the bolts to **3 daN.m** then carry out angle tightening of  $51^\circ \pm 3^\circ$  in the order recommended below.



Wait for a minimum of 3 minutes to allow the gasket to settle.

### 2) Tightening the cylinder head bolts :

- slacken bolts 1-2 until they are completely free, then tighten to **2.5 daN.m**, then carry out angle tightening of  $108^\circ \pm 3^\circ$ ,
- carry out the same operation for bolts 3 - 4, 5 - 6, 7 - 8, and 9 - 10

The cylinder head is not retightened.



### G8T Engine

All of the cylinder head bolts must be systematically replaced following dismantling. The cylinder head is not retightened.

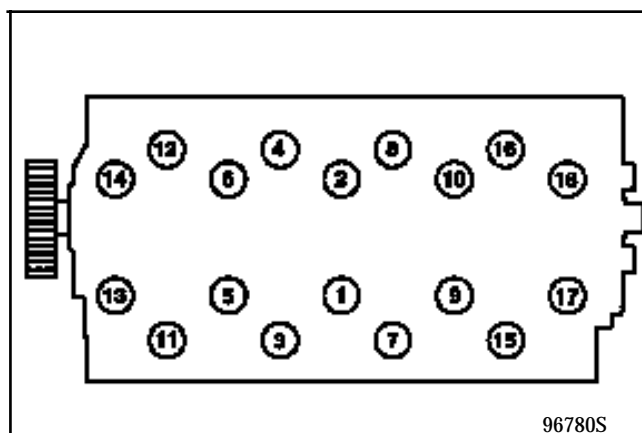
Lubricate the threads and under the bolt heads with engine oil.

### Method of tightening the cylinder head bolts

#### - Pre-settling the gasket :

- Tighten all of the bolts to **2 daN.m**. then carry out angle tightening according to the table below and in the recommended order of 1 to 18.

Bolt mark	Angle of tightening (in degrees) $\pm 2^\circ$	Bolt length (in mm)
1, 5, 9, 13, 17	215°	185 with washer
2, 6, 10, 14, 18	240°	185 without washer
3, 7, 11, 15	160°	103 with washer
4, 8, 12, 16	246°	207.5 without washer



Settling the gasket : wait 3 minutes to allow to settle

#### - Tightening :

- slacken bolts **1 - 2** until they are completely free,
- tighten bolts **1 - 2** to **2 daN.m** then angle tighten according to the table on the next page,
- slacken bolts **3, 4, 5, 6** until they are completely free,
- tighten bolts **3, 4, 5, 6** to **2 daN.m**, then angle tighten according to the table on the next page,
- slacken bolts **7, 8, 9, 10**, until they are completely free
- tighten bolts **7, 8, 9, 10** to **2 daN.m**, then angle tighten according to the table on the next page,
- slacken bolts **11, 12, 13, 14**, until they are completely free
- tighten bolts **11, 12, 13, 14** to **2 daN.m**, then angle tighten according to the table on the next page,
- slacken bolts **15, 16, 17, 18** until they are completely free,
- tighten bolts **15, 16, 17, 18** to **2 daN.m**, then angle tighten according to the table on the next page,

Bolt mark	Angle of tightening (in degrees) $\pm 2^{\circ}$	Bolt length (in mm)
1, 5, 9, 13, 17	296°	185 with washer
2, 6, 10, 14, 18	301°	185 without washer
3, 7, 11, 15	243°	103 with washer
4, 8, 12, 16	322°	207.5 without washer

J8S transverse engine :

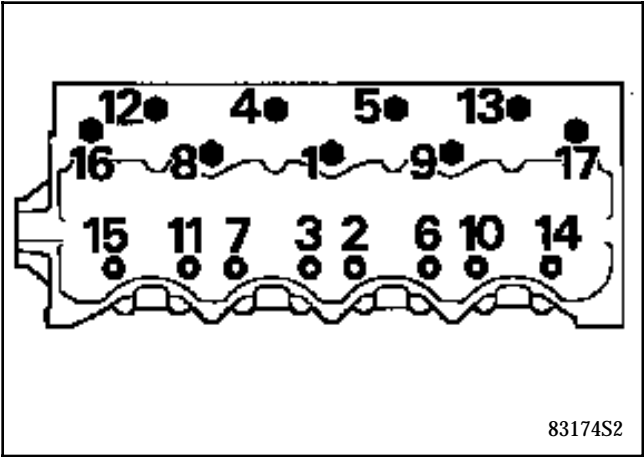
Method of tightening :

All of the bolts must be replaced following dis-  
mantling.  
Lubricate the threads and under the bolt heads  
with engine oil.

Reminder :

In order to obtain correct tightening of the cylin-  
der head bolts, extract any oil which may be in the  
cylinder head securing holes, using a syringe.

Proceed in the following order :  
1st Tightening                    3 daN.m  
2nd Tightening                  5 daN.m



Slacken off **each bolt** until they are completely  
free, then carry out :

1st Retightening 2 daN.m

2nd Retightening (angle) according to the table

Bolt	Angle in degrees	Bolt	Angle in degrees
1	105	10	60
2	60	11	60
3	60	12	80
4	80	13	70
5	70	14	60
6	60	15	60
7	60	16	90
8	105	17	80
9	105		

3rd Retightening (angle) according to the table

Bolt	Angle in degrees	Bolt	Angle in degrees
1	105	10	60
2	60	11	60
3	60	12	80
4	80	13	70
5	70	14	60
6	60	15	60
7	60	16	90
8	105	17	80
9	105		

The cylinder head is not retightened.

J8S longitudinal engine :

Method of tightening :

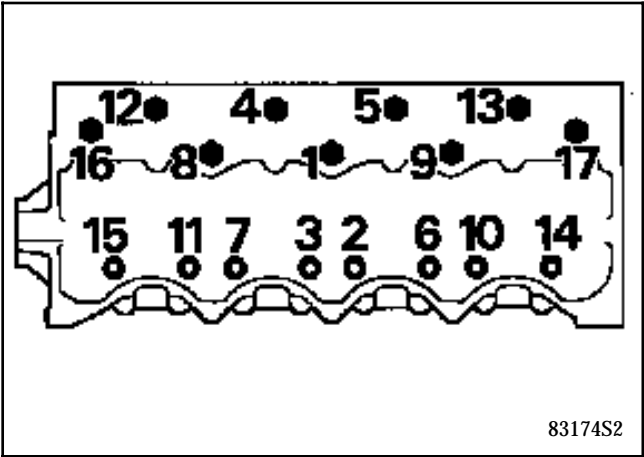
All of the bolts must be replaced following dis-  
mantling.  
Lubricate the threads and under the bolt heads  
with engine oil.

Reminder :

In order to obtain correct tightening of the cylin-  
der head bolts, extract any oil which may be in the  
cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening                    3 daN.m  
2nd Tightening                5 daN.m



Slacken off **each bolt** until they are completely  
free, then carry out :

1st Retightening                2 daN.m

2nd Retightening (angle) according to the table

Bolt	Angle in degrees	Bolt	Angle in degrees
1	105	10	60
2	60	11	60
3	60	12	70
4	70	13	70
5	70	14	60
6	60	15	60
7	60	16	80
8	105	17	80
9	105		

3rd Retightening (angle) according to the table

Bolt	Angle in degrees	Bolt	Angle in degrees
1	105	10	60
2	60	11	60
3	60	12	70
4	70	13	70
5	70	14	60
6	60	15	60
7	60	16	80
8	105	17	80
9	105		

The cylinder head is not retightened.

J Engine petrol 8-valve 2 and 2.2 litre versions.

All of the bolts must be replaced following dismantling.

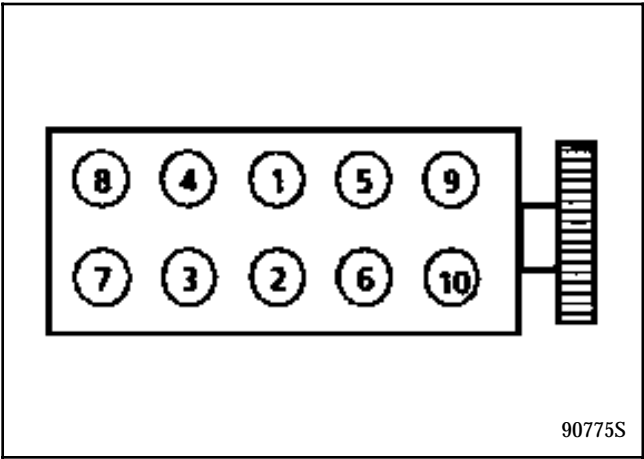
Lubricate the threads and under the bolt heads with engine oil.

Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

- 1st Tightening 2 daN.m
- 2nd Tightening (angle) 105°



Wait for a minimum of 3 minutes

Retighten (angle), without slackening beforehand, to 105°

The cylinder head is not retightened.

J Engine petrol 12-valve 2 and 2.2 litre versions.

All of the bolts must be replaced following dismantling.

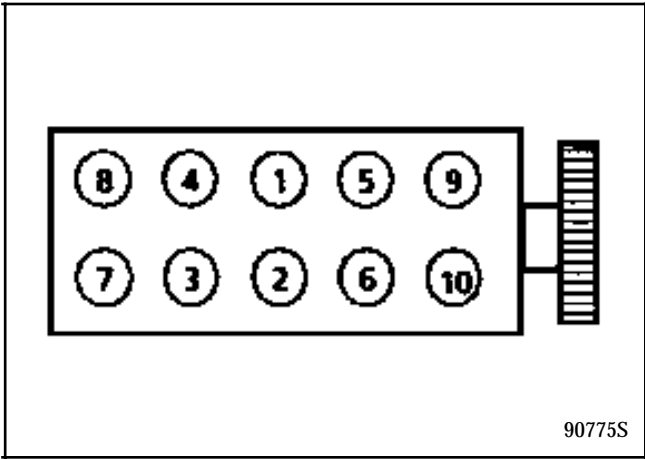
Lubricate the threads and under the bolt heads with engine oil.

Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

- 1st Tightening 2 daN.m
- 2nd Tightening (angle) 80°



Wait for a minimum of 3 minutes

Retighten (angle), without slackening beforehand, to 80°

The cylinder head is not retightened.

**J Engine petrol 8-valve 2.0 litre Turbo.**

**Gasket containing asbestos.**

**Method of tightening :**

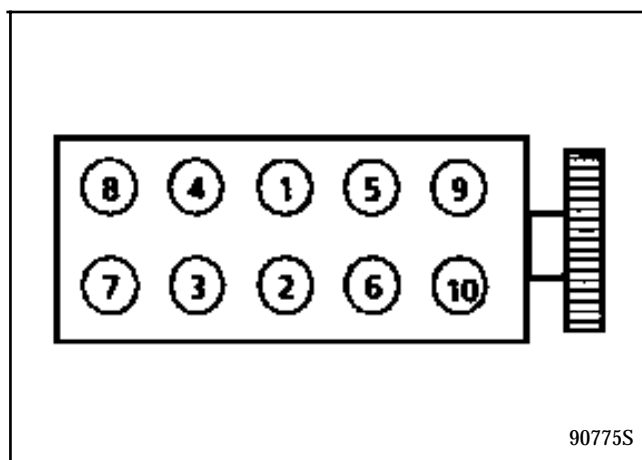
Lubricate the threads and under the bolt heads with engine oil.

**Reminder :**

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening	<b>2 daN.m</b>
2nd Tightening (angle)	<b>105°</b>



**Wait for a minimum of 3 minutes**

1st Retightening (angle) without slackening beforehand, to **105°**.

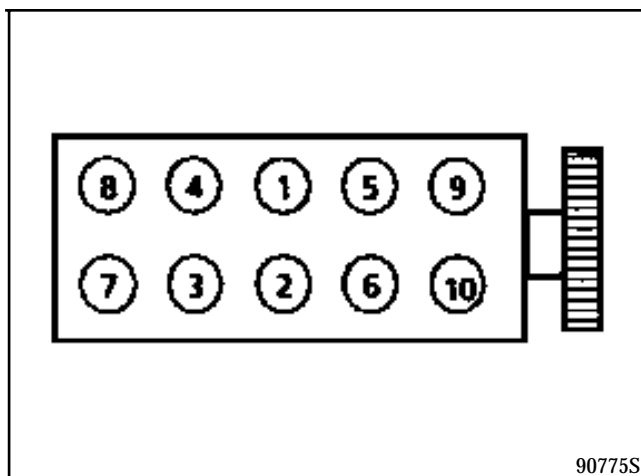
**Run the engine until the engine cooling fan cuts in.**

- allow the engine to cool
- proceed by carrying out an additional angle tightening of **20°** (without slackening beforehand)

The cylinder head is not retightened.

**K7M Engine****Method of tightening**

All of the cylinder head bolts must be systematically replaced following dismantling.  
Lubricate the threads and the bolt heads with engine oil.

**Pre-settling the gasket**

Tighten to **2 daN.m**, then carry out an **angle tightening of  $100^\circ \pm 6^\circ$**  in the recommended order :

- tighten bolts 1-2,
- tighten bolts 3-4-5-6,
- tighten bolts 7-8-9-10.

**Settling the gasket**

Wait for 3 minutes to allow the gasket to settle

**Tightening**

- Slacken bolts 1-2.  
Retighten bolts 1-2 to **2 daN.m**, then carry out an **angle tightening of  $110^\circ \pm 6^\circ$** .
- Slacken bolts 3-4-5-6.  
Retighten bolts 3-4-5-6 to **2 daN.m**, then carry out an **angle tightening of  $110^\circ \pm 6^\circ$** .
- Slacken bolts 7-8-9-10.  
Retighten bolts 7-8-9-10 to **2 daN.m**, then carry out an **angle tightening of  $110^\circ \pm 6^\circ$** .

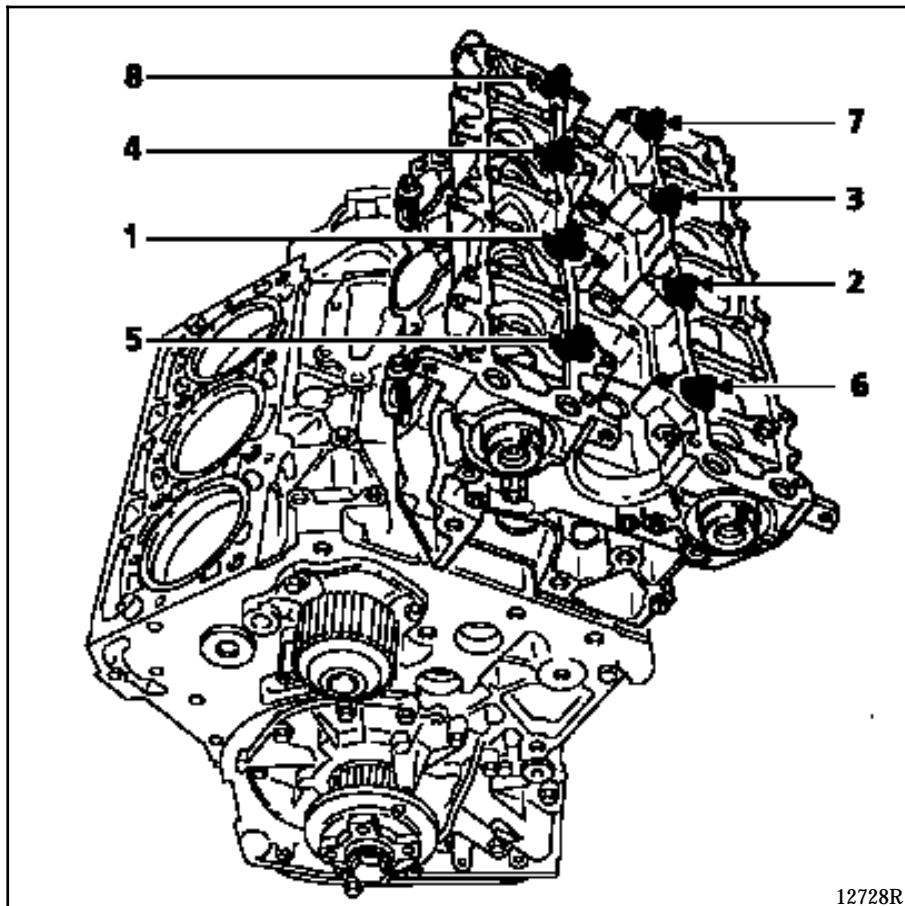
The cylinder head is not retightened.

**L7X Engine****Method of tightening**

Check the length of the bolts under the bolt head which should be  $147.5 \pm 0.3$  mm.

**Do not re-use the bolts if the length exceeds 149.5 mm.**

Bolts that are to be re-used must be brushed and the threads and bolt heads lubricated with engine oil.



12728R

- Pre-tighten to **2 daN.m** in the recommended order.
- Completely slacken off bolt ( 1 ).
- Retighten bolt( 1 ) to **1.5 daN.m**, then carry out an **angle tightening of  $225^\circ$** .
- Carry out the same operation for the other bolts.

Carry out the same operation for the other cylinder head bolts.

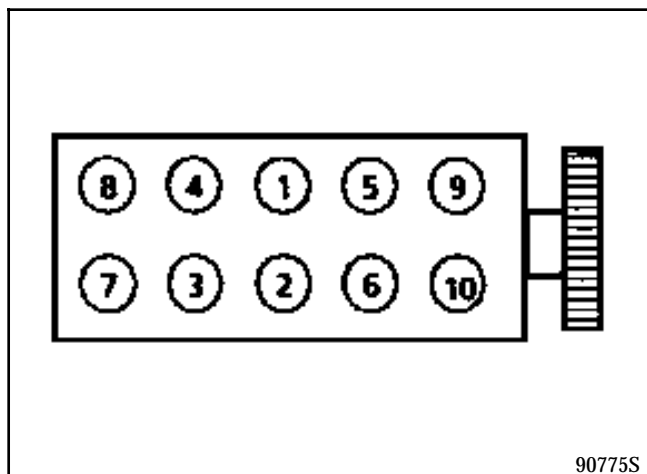


### N7Q-N7U Engines

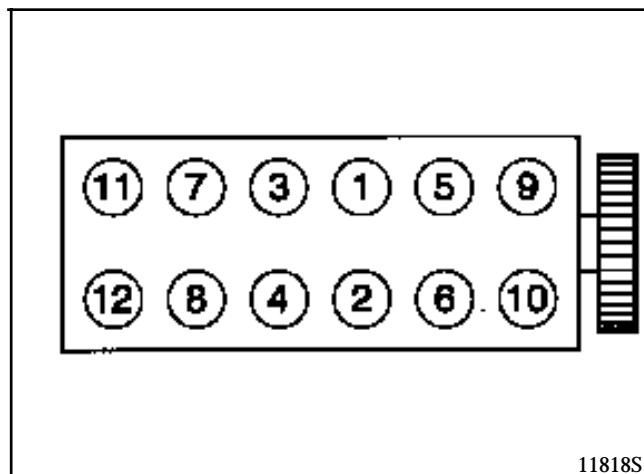
#### Method of tightening

All of the cylinder head bolts must be systematically replaced following dismantling.  
Lubricate the threads and the bolt heads with engine oil.

*N7Q Engine*



*N7U Engine*



Tightening the cylinder head bolts is the same for 4 and 5 cylinder versions.

#### Pre-settling the gasket

Tighten to **2 daN.m**, then carry out a 2nd tightening to **6 daN.m**, in the recommended order.

#### Settling the gasket

Wait 3 minutes to allow the gasket to settle.

#### Tightening

Angular tighten (without slackening beforehand) all the bolts to **150° ± 5°**, in the recommended order.

The cylinder head is not retightened.

S8U - S9U - S9W - 8140 Engine

Method of tightening :

All of the bolts must be replaced following dismantling.

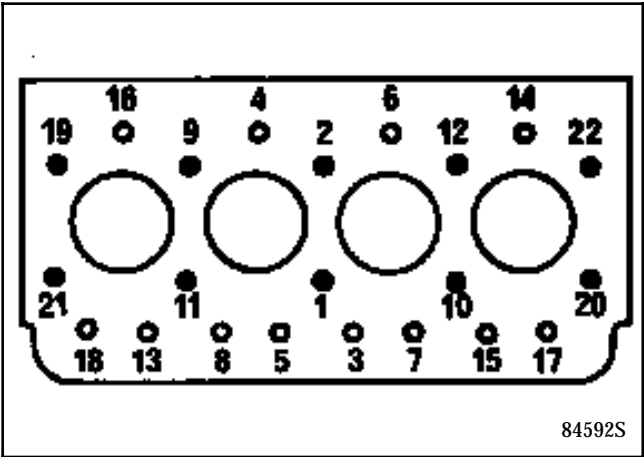
Lubricate the threads and under the bolt heads with engine oil.

Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Pre-tightening	4 daN.m
Standardised tightening	4 daN.m
Tightening (angle)	180°± 10°

- Short bolts.
- Long bolts.



The cylinder head is not retightened.

S8U - 8144 Engine ( Safrane )

Method of tightening :

All of the bolts must be replaced following dismantling.

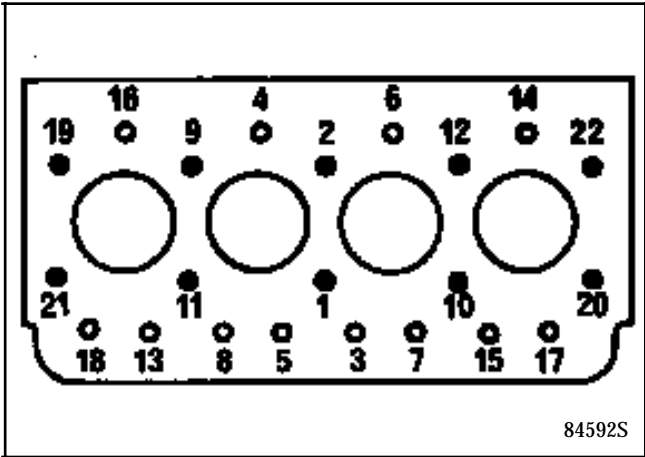
Lubricate the threads and under the bolt heads with engine oil.

Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Pre-tightening	6 daN.m
Standardised tightening	6 daN.m
Tightening (angle)	180° ± 10°

- Short bolts.
- Long bolts



The cylinder head is not retightened.

**Z7X Engine (except Z7X 744)**

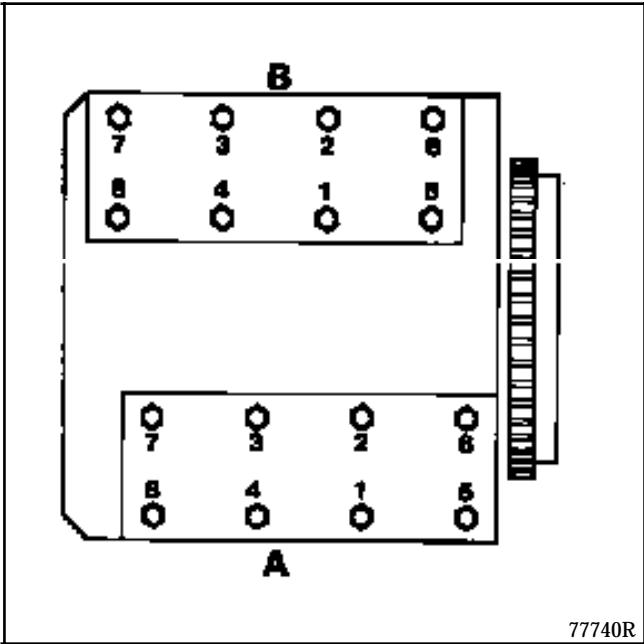
**Method of tightening :**

Lubricate the threads and under the bolt heads with engine oil.

**Reminder :**

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

1st Tightening                      **6 daN.m**



**Wait for a minimum of 3 minutes to allow to settle.**

Slacken each bolt,  
then carry out :

1st Retightening                      **4 daN.m**  
2nd Retightening (angle)    **180°**

The cylinder head is not retightened.

**Z7X 744 Engine****Method of tightening :**

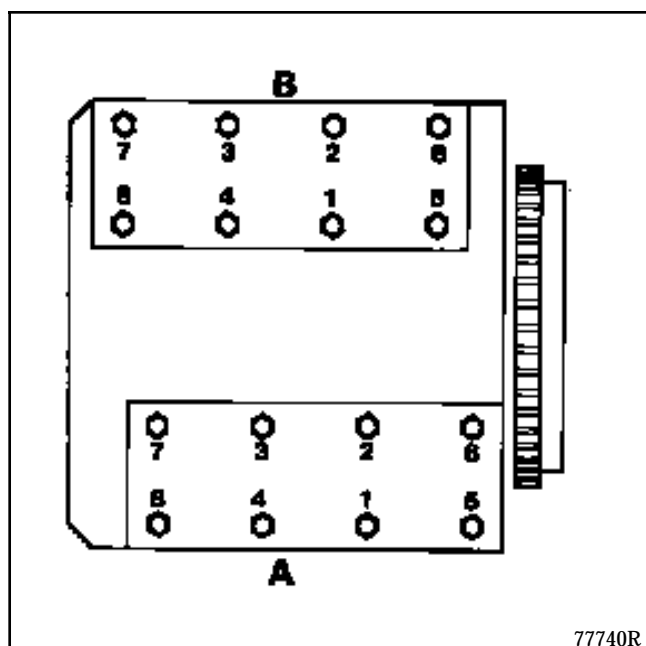
Lubricate the threads and under the bolt heads with engine oil.

**Reminder :**

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening **6 daN.m**



Wait for a minimum of 3 minutes to allow to settle.

Slacken each bolt,  
then carry out :

1st Retightening **4 daN.m**

2nd Retightening (angle) **180°**

Run the engine until the engine cooling fan cuts in.

Leave the engine to cool (engine stopped for a minimum of 6 hours).

Carry out an additional retightening operation of **50°** (without slackening beforehand).

The cylinder head is not retightened.

**Z7W Engine (except 702)**

### Method of tightening :

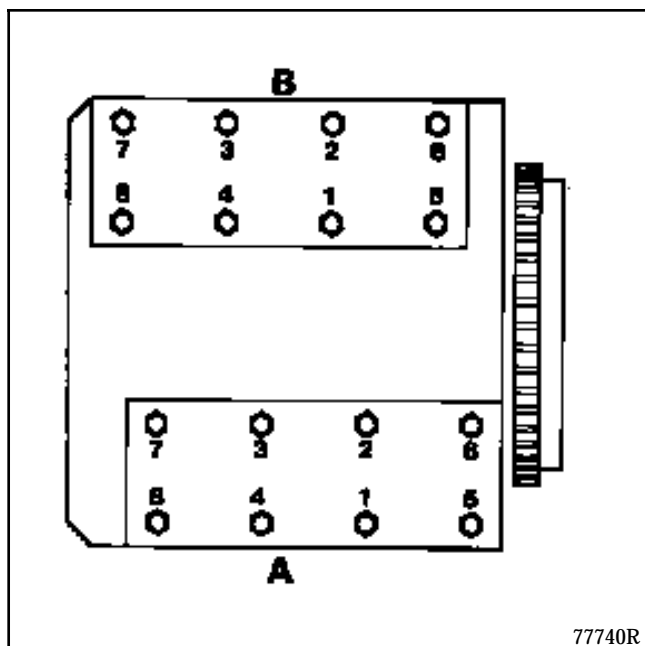
Lubricate the threads and under the bolt heads with engine oil.

### Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening **6 daN.m**



Wait a minimum of 3 minutes to allow to settle.

Slacken each bolt,  
then carry out :

1st Retightening **2 daN.m**

2nd Retightening (angle) **106°**

Adjust the valve clearance.

Run the engine until the engine cooling fan cuts in.

Leave the engine to cool (engine stopped for a minimum of 6 hours).

Carry out an additional retightening operation of 45° (without slackening beforehand).

The cylinder head is not retightened.

**Z7U - Z7W 702 Engine (except Z7U 734)**

### Method of tightening :

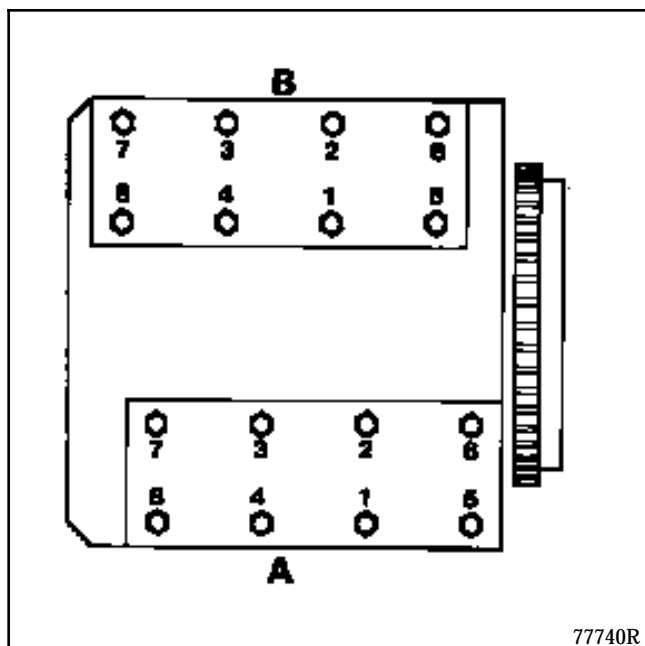
Lubricate the threads and under the bolt heads with engine oil.

### Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening **6 daN.m**



Wait a minimum of 3 minutes to allow to settle.

Slacken each bolt,  
then carry out :

1st Retightening **2 daN.m**

2nd Retightening (angle) **127°**

Adjust the valve clearance.

Run the engine until the engine cooling fan cuts in.

Leave the engine to cool (engine stopped for a minimum of 6 hours).

Carry out an additional retightening operation of 25° (without slackening beforehand).

The cylinder head is not retightened.

Z7U 734 Engine

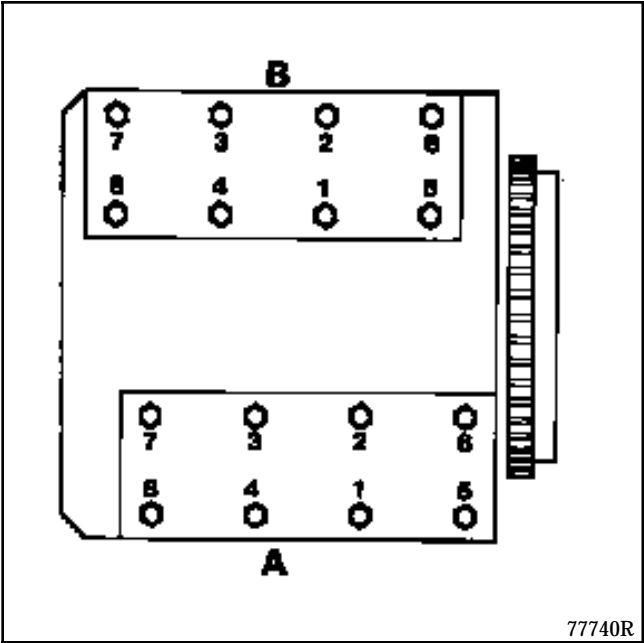
Method of tightening :

Lubricate the threads and under the bolt heads with engine oil.

Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :  
1st Tightening                      6 daN.m



Wait a minimum of 3 minutes to allow to settle.

Slacken each bolt,  
then carry out :

1st Retightening                      2 daN.m  
2nd Retightening (angle)    106°

Adjust the valve clearance.

Run the engine until the engine cooling fan cuts in.

Leave the engine to cool (engine stopped for a minimum of 6 hours).

Carry out an additional retightening operation of 45° (without slackening beforehand).

The cylinder head is not retightened.

### Z7V - Z6W Engine

#### Method of tightening :

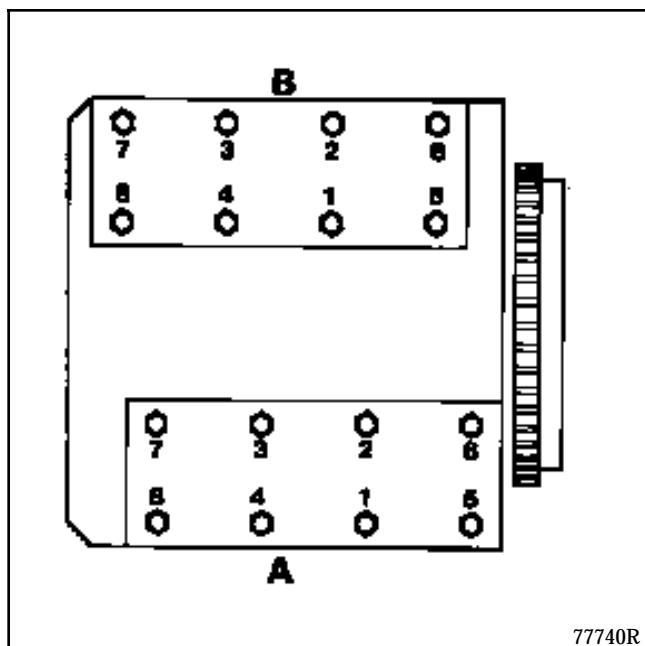
Lubricate the threads and under the bolt heads with engine oil.

#### Reminder :

In order to obtain correct tightening of the cylinder head bolts, extract any oil which may be in the cylinder head securing holes, using a syringe.

Proceed in the following order :

1st Tightening **6 daN.m**



Wait a minimum of 3 minutes to allow to settle.

Slacken each bolt,  
then carry out :

1st Retightening **2 daN.m**

2nd Retightening (angle) **115°**

Adjust the valve clearance.

Run the engine until the engine cooling fan cuts in.

Leave the engine to cool (engine stopped for a minimum of 6 hours).

Slacken all of the bolts, then carry out :

1st Retightening **2 daN.m**

2nd Retightening (angle) **115°**

The cylinder head is not retightened.