

Name: _____

Date: _____

Automatic Transmission & Transaxle Work Example 1

WorkKey Level: 4

NATEF Automotive Tasks: II.D.4.2

With pressure plate B installed, clutch pack clearance on a forward clutch is found to be 0.060". The specifications call for $0.020" \pm 0.010"$. Which pressure plate do you need to substitute in place of plate "B" to correct the clutch pack clearance?

Pressure plates	Thickness
A	0.100
B	0.125
C	0.150
D	0.175

Solution

The range is $0.020" \pm 0.010"$.

$0.020" - 0.010" = 0.010"$

$0.020" + 0.010" = 0.030"$

$0.010" \leq \text{pressure plate} \leq 0.030"$

You will need to substitute plate "D" to go with minimum clearance.

Automatic Transmission & Transaxle Work Example 2

WorkKey Level: 4

NATEF Automotive Tasks: II.D.2.2

The technician is checking torque converter stator endplay. When it is all the way down, the dial indicator reads 0.675" and when it is up, it reads 0.725". The manufacturer's endplay tolerance is $0.050" \pm 0.010"$. Is this torque converter usable? Justify your answer.

Solution

The tolerance is $0.050'' \pm 0.010''$

$$0.050'' - 0.010'' = 0.040''$$

$$0.050'' + 0.010'' = 0.060''$$

$$0.040'' \leq n \leq 0.060''$$

$$0.725'' - 0.675'' = 0.050''$$

Since $0.050''$ is between $0.040''$ and $0.060''$, yes, the torque converter is usable.

Automatic Transmission & Transaxle Work Example 3

WorkKey Level: 4

NATEF Automotive Tasks: II.D.3.1; II.D.3.2, II.D.3.4

With selective thrust washer C installed, transmission output shaft endplay is found to be $0.019''$. The specifications call for $0.008'' \pm 0.005''$. Which selective thrust washer do you need to install to correct the transmission output shaft endplay?

Selective thrust washer	Thickness
A	0.045
B	0.055
C	0.065
D	0.075

Solution

The specifications fall within the range $0.008'' \pm 0.005''$.

$$0.008'' - 0.005'' = 0.003''$$

$$0.008'' + 0.005'' = 0.013''$$

$$0.003'' \leq n \leq 0.013''$$

Since the only selective thrust washer thicker than “C” is “D,” selective thrust washer “D” is the correct answer. After installing selective thrust washer “D,” the transmission output shaft endplay is $0.009''$, which falls within the above-specified range.

Automatic Transmission & Transaxle Work Example 4

WorkKey Level: 4

NATEF Automotive Tasks: II.D.2.3; II.D.3.3; II.D.3.6

The pump body has a gear cavity that is 0.697" deep. The pump gear is 0.6963" thick. The specifications read $0.001" \pm 0.0002"$ pump gear clearance. What is the pump clearance? Is it within manufacturer's specifications?

Solution

The range is $0.001" \pm 0.0002"$

$0.001" - 0.0002" = 0.0008"$

$0.001" + 0.0002" = 0.0012"$

$0.0008" \leq \text{pump gear clearance} \leq 0.0012"$

The pump clearance is found by subtracting the pump gear measurement from the gear cavity.

$0.697" - 0.6963" = 0.0007"$

Since 0.0007" does not fall within 0.0008" and 0.0012", no, it is not within manufacturer's specifications.

Automatic Transmission & Transaxle Work Example 5

WorkKey Level: 4

NATEF Automotive Tasks: II.A.5, II.A.8

Manufacturer's specs state that pressure readings in drive should be within 10% of pressure readings in neutral. Is the drive reading as indicated below within spec? What are the possible explanations for this? What would be a possible customer complaint?



Neutral (Park)



Drive

Solution

No, the drive reading is not within specs. An acceptable spec range is $\pm 10\%$ of park.

$$(\text{park})(10\%) = (\text{appx. } 180)(0.10) = 18 \text{ psi}$$

$$162 \text{ psi} \leq \text{reading} \leq 198 \text{ psi}$$

Possible explanations may vary. Some examples are:
No drive engagement and no reverse engagement.

Possible customer complaints may vary. Some examples are:
Soft shift, slipping, and no engagement.

Automatic Transmission & Transaxle Work Example 6

WorkKey Level: 4

NATEF Automotive Tasks: II.A.1, II.A.4, II.A.5

Manufacturer's specs state that pressure readings in drive should be within 10% of pressure readings in park. Are the drive readings as indicated below within spec? What are the possible explanations for this? What would be a possible customer complaint?

**Solution**

The first gear is within specs; however, the second gear is not within specs.

A possible explanation would be internal leakage for the second-gear components.

Possible customer complaints may vary.

Automatic Transmission & Transaxle Work Example 7

WorkKey Level: 5

NATEF Automotive Tasks: Background

You are changing the rear-axle ratio and replacing the automatic transmission on your car. The engine and transmission are coupled by a torque converter. The converter's maximum torque multiplication is approximately 2.3:1. You know the final output torque for the entire drive train in a given gear is the product of the engine torque, maximum torque multiplication of the torque converter, gear ratio, and rear-axle ratio. The low-gear ratio in the transmission being replaced is 2.63:1. The low-gear ratio in the new transmission is 2.9:1. The rear-axle ratio is being changed from 2.89:1 to 3.84:1.

1. What is the final output torque for the entire drive train in first gear **before** the changes when the engine is developing 250 pound-feet of torque?
2. What is the final output torque for the entire drive train in first gear **after** the changes when the engine is developing 250 pound-feet of torque?
3. What is the percent of increase in final output torque?

Solution

1. Final torque = $250 \text{ lb-ft} \times 2.3 \times 2.63 \times 2.89$
Final torque = 4370 lb-ft
2. Final torque = $250 \text{ lb-ft} \times 2.3 \times 2.9 \times 3.84$
Final torque = 6403 lb-ft
3. Percent increase = $\frac{6403 - 4370}{4370} \times 100$
Percent increase = 46.5%