Flywheel service

Resurfacing, measurement and clutch contact

When the clutch engages, the pressure plate clamps the lining against the flywheel. Before removing metal, GTE inspects the friction face and checks whether the design and remaining dimensions allow resurfacing.

Follow a Lamborghini workshop example from the first gauge reading through grinding and final inspection. See how GTE checks the finished face, uses film to demonstrate local contact and preserves the dimensions that matter for clutch setup.

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Reading the workshop sample

The measured cut removed 0.07 mm (70 µm). The four finished-face readings ranged from 0.00 to −0.03 mm relative to gauge zero. Material removed and local surface height are different measurements.

GTE reports thousands of rebuilds across 50+ rebuild offerings.

Inspection and resurfacing

The COMEC flywheel grinder

GTE uses an Italian-built COMEC flywheel and clutch pressure-plate grinder. Its rotary table turns the flywheel beneath a vertical grinding head. The technician sets the depth of cut and selects the stone to suit the metal and the finish required on the clutch contact track.



Fig. 1a GTE's COMEC grinder

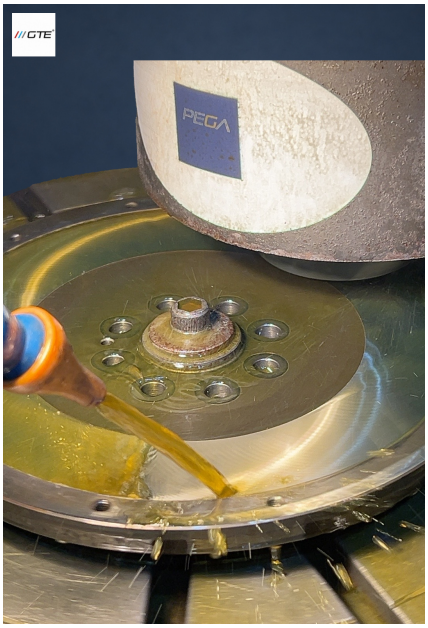


Fig. 1b Grinding under coolant

Centering the flywheel

The fixture centers and secures the flywheel. The rotary table carries the full circumference of the friction track past the stone.

Controlling the cut

The vertical head positions the stone against the track. The feed control lets the technician advance the stone as material comes off.

Cooling the contact area

A nozzle directs coolant where the stone meets the metal, carrying away heat and grinding debris.

Preparing and checking the cut

GTE checks the starting height, step where applicable, and remaining service dimensions. The technician selects from premium ceramic and silicon-carbide grinding stones according to the flywheel material. Dressing exposes fresh abrasive. After grinding, GTE looks for a continuous ground band across the working width and checks the height at several points.

How much material comes off?

GTE often removes about 0.10 mm (100 µm) or less where the part permits, using controlled cuts and checking dimensions throughout. The amount depends on the flywheel design, condition and applicable service dimensions. The photographed example removed 0.07 mm (70 µm).

TYPICAL GTE CUT	PHOTOGRAPHED LAMBORGHINI EXAMPLE
Around 100 µm or less	**70 µm removed**

Measuring the cut

12.67 mm before cutting, 12.60 mm after resurfacing

Two views at each stage show the bridge indicator on the friction track. Subtracting the after-service reading from the before-service reading gives the depth of the cut on this sample.

BEFORE MINUS AFTER	MATERIAL REMOVED
12.67 mm − 12.60 mm	**0.07 mm / 70 µm**



Before cutting

12.67 mm



Gauge detail

Fig. 2 / View 1



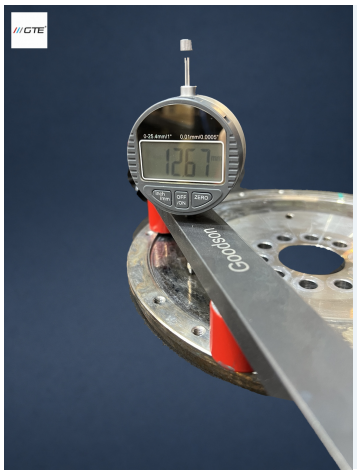
After resurfacing

12.60 mm



Gauge detail

Fig. 3 / View 1



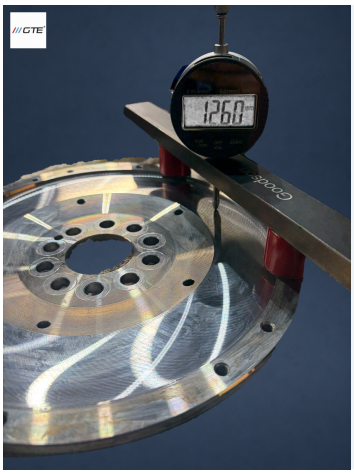
Before cutting

12.67 mm



Gauge detail

Fig. 4 / View 2



After resurfacing

12.60 mm



Gauge detail

Fig. 5 / View 2

Reading the before-and-after pair

To compare depths, use the same reference surface and gauge setup at both stages. The difference gives the amount removed. Page 4 shows how the finished face compares from one probe position to another.

Both 12.60 mm displays are enlarged from the camera photographs and brightened for readability.

Checking the finished face

Four-point check of the finished friction face

The indicator probe touches the track where the clutch lining seats. On this GTE workshop sample, the highest of four photographed readings was 0.00 mm and the lowest was −0.03 mm. The four sampled heights are within 0.03 mm (30 µm) of one another.

MATERIAL REMOVED IN THE CUTTING EXAMPLE	SPREAD AT FOUR POST-SERVICE POINTS
0.07 mm / 70 µm	**0.03 mm / 30 µm**



Point A

0.00 mm



Gauge detail

Fig. 6 / IMG_8951



Point B

0.00 mm



Gauge detail

Fig. 7 / IMG_8952



Point C

−0.03 mm



Gauge detail

Fig. 8 / IMG_8953



Point D

−0.01 mm



Gauge detail

Fig. 9 / IMG_8954

What the indicator measures

The indicator compares one location at a time against the same setup reference. To check for curvature across the whole track, take readings at several radii and clock positions without changing the datum. Compare the measured profile with the method and dimensions for that specific part.

Technical references on page 5

Technical references

Aston Martin · Automated clutch learning example

Aston Martin's workshop bulletin SB-07-0315V4 covers applicable V8 Vantage and Vantage S SportShift models. It describes an automatic clutch kiss-point learn that the technician verifies. The requirements are model- and system-specific.

Aston Martin service bulletin SB-07-0315V4

Hamburg University of Technology · Loaded contact

Abdullah and Schlattmann modeled the flywheel, disc and pressure plate under spring and centrifugal loading. Their study examines how contact stiffness affects pressure distribution. A bridge indicator measures unloaded face geometry, while actual lining pressure develops in the clamped assembly.

Abdullah & Schlattmann (2013) / Contact Analysis of a Dry Friction Clutch System

AP Racing · Race clutch applications

AP Racing describes how the pressure plate transmits clamp load through its friction face and identifies flat and stepped flywheel mounting options. Its Formula 3 CP8662 family uses a carbon pack. These application references supply no crown tolerance or machining allowance for a Lamborghini road flywheel.

AP Racing / Metallic clutch technical information

AP Racing / Formula 3 CP8662 catalogue

ISO references for the measurement

ISO 12781-1:2011	Flatness vocabulary for nominally planar surfaces.
ISO 12781-2:2011	How the complete planar surface is evaluated.
ISO 13102:2012	Characteristics of the electronic digital indicator.
ISO 14253-1:2017	Conformity decisions using measurement uncertainty.

Goodson / FGG-12 flywheel depth gauge

Grinding stones and surface finish

GTE's shop reference lists Goodson FGW-374 for cast iron, FGW-69 for cast steel and FGW-56 for billet steel. The following manufacturer references cover wheel selection, dressing and coolant.

Goodson / Flywheel grinding stones

Goodson / Grinder setup and wheel dressing

COMEC / Flywheel and clutch pressure-plate grinders

GTE / Precision Clutch & Flywheel Balancing

GTE / Balancing vs Calibration installer guide

Optional flywheel balancing

In-house bench balancing is available for an additional charge

Ask GTE to add balancing to the resurfacing estimate. Specify whether you are sending the flywheel alone or an eligible matched clutch assembly so the quote and the certificate identify the components being balanced.



Fig. 10 GTE balancing workstation

What the machine measures

GTE fixtures the agreed component on its MBS Balans V-IVB 100 vertical balancing machine. The machine measures how unevenly the mass is distributed as the part spins. Correcting that imbalance reduces the rotating force that can cause vibration at speed. The technician then spins the part again to verify the result.

The balancing certificate

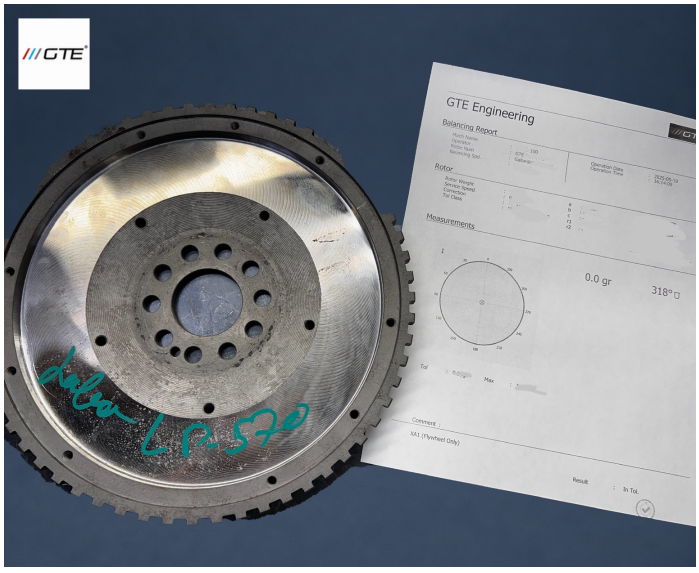


Fig. 11 Gallardo flywheel and its balancing report

Reading the sample report

This Gallardo example is marked “Flywheel Only.” The final result reads “In Tol.” for that component and test setup.



Detail from the original GTE report

Request a copy with your parts

GTE keeps a certificate for every balancing job. If you want a copy in the return shipment, request it when you authorize balancing.

GTE / Precision Clutch & Flywheel Balancing
M1 balancing / Ferrari and Maserati

Request a balancing quote
M2 balancing / Ferrari and Lamborghini

Final quality control

What GTE reviews before returning the flywheel

The technician reviews the completed work against the requirements for the specific flywheel. The review covers the dimensions left after machining, the condition of the clutch contact track and any balancing the customer requested.

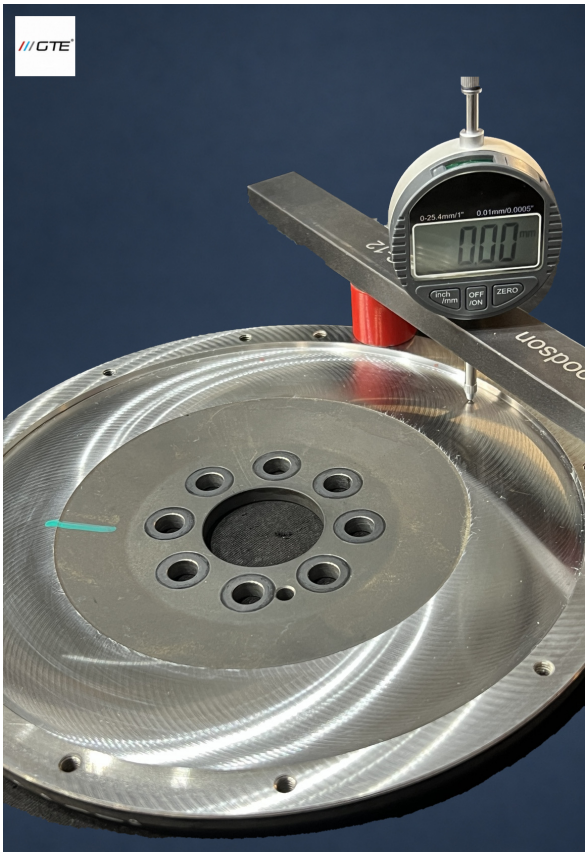


Fig. 12 Probe on the finished friction track

Finished dimensions

Compare the finished friction-face height and any specified step with the dimensions for that flywheel. The before-and-after difference records how much material the cut removed.

Friction-track profile

Inspect the ground band across the width of the track. Compare probe readings taken from a common reference at several positions. Where a profile tolerance is specified, use the applicable method and limit to assess it.

Balance record, if ordered

Review the final balance result for the component or matched assembly actually tested. The certificate identifies that setup. GTE retains it and can include a copy with the return shipment on request.

Record the setup

Record the datum, indicator setup and before-and-after readings so the next technician can reproduce the measurement.

Two readings, two different jobs

Material removed

Compare before and after from the same datum. The workshop example removed 0.07 mm (70 µm).

Finished-face profile

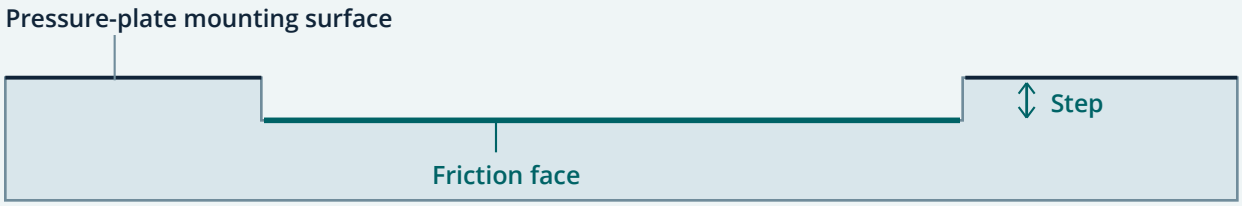
A local dial-indicator reading records height versus gauge zero. It is not the amount ground off.

The finished face and any specified step must be checked for the particular application.

Return to the service overview

From surface height to loaded contact

Fig. 13a / Reference surfaces for a stepped design



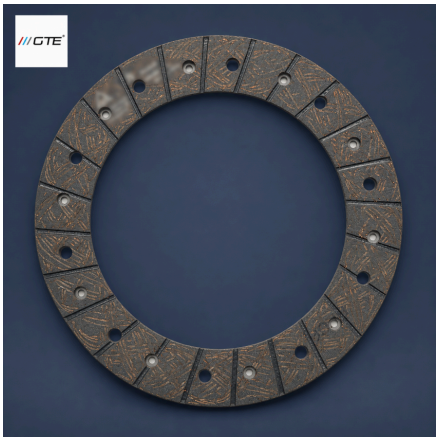
Illustrative section only · Not to scale · Use the datum specified for the part

The friction face and, where specified, the step relative to the pressure-plate mounting surface are checked separately. Other designs use different reference geometry. Use the dimensions and measurement method for the specific part.

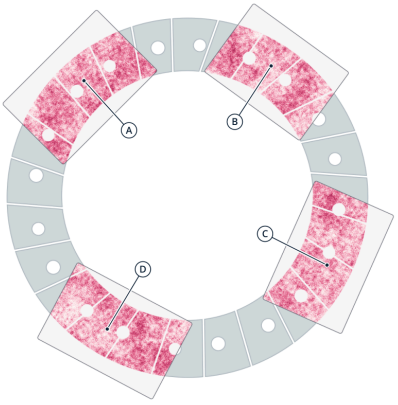
Fig. 13b / Four pressure-film checks under clamp load

Lamborghini Aventador / PEGA Clutch® Performance Lining FX4C-SC

Lining shown as a workshop example.



Aventador lining used for illustration



A–D / Schematic film positions

For the workshop check, GTE placed four short strips at the lining interface and bolted down the pressure plate for about five minutes at room temperature. After removing the plate, GTE reported visible contact with no visible gaps in the four checked areas. The pink transfer is illustrative, and the gray sectors were not sampled.

Fujifilm / pressure-sensitive film

TU Hamburg / loaded clutch contact

Preserving setup geometry

GTE uses a controlled, fine cut to restore the surface while preserving the working geometry. The part's design, starting condition and specified service dimensions govern how much may be removed.

FINE-CUT EXAMPLE

0.10 mm = 100 µm

Example scale, not a target

TEN TIMES THE CUT DEPTH

1.00 mm = 1,000 µm

Comparison only, not a rejection limit

These numbers compare cut depths, not machine capability or service limits. In the photographed example, 12.67 mm before and 12.60 mm after gives a measured cut of 0.07 mm (70 µm).

Two clutch setup procedures

Technician-set PIS

On systems that specify manual entry, a technician sets the Point of Initial Slip (PIS) with the prescribed diagnostic procedure. Use the values and checks for the installed system.

Automated clutch learning (ASM)

On applicable systems such as certain Aston Martin SportShift models, the control system learns the clutch kiss point and the technician verifies the result as specified. Procedures vary by application.

Learning is not a substitute for correct mechanical geometry. Verify the flywheel dimensions first, then use the approved setup and checks for the vehicle, clutch and control system.

Conclusion

Measure first, remove only what the part requires, and verify the finished geometry before release. This is how GTE preserves the dimensions that matter to clutch setup. It takes precise tooling, careful measurement and the judgment to know when to stop cutting.

Aston Martin / SportShift kiss-point learn

GTE / Installer calibration guide