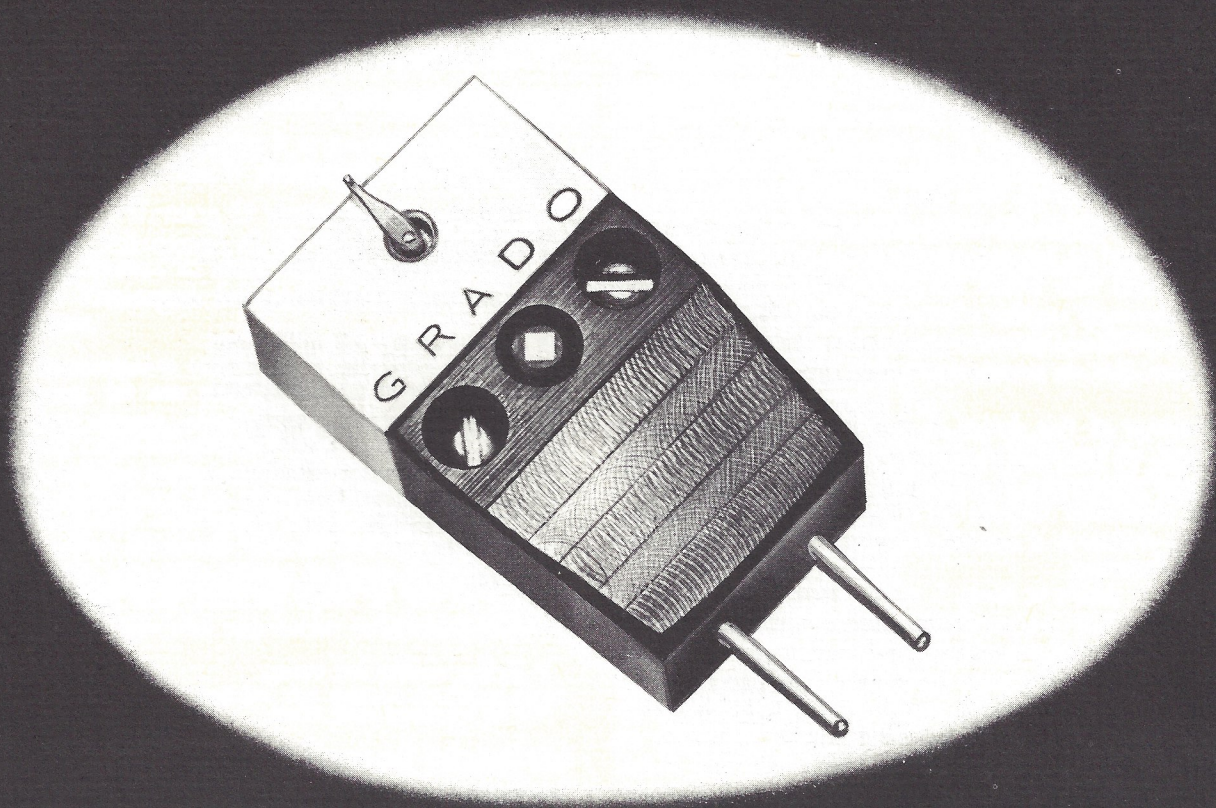


*Superb Craftsmanship*

*Magnificent Performance*



quality designed by **GRADO**

## THE GRADO PHONOGRAPH CARTRIDGE

The superior performance of this electro-dynamic phonograph cartridge is the result of constant research and the development of special new processes necessary to meet the *high manufacturing standards set by the GRADO laboratories.*

For a phonograph cartridge to be a quality performer, the total mass of its moving parts must be almost infinitesimal. Because of this, only highly skilled specially trained personnel are capable of assembling our cartridges. To insure the utmost of quality each unit is individually custom finished by hand. Only the very finest of materials with unusually close tolerances are used in these cartridges. *A quality product regardless of cost is the aim of GRADO.*

As illustrated in figures 1 and 2, the coil is wound on a sub-miniature bobbin. This air core, bobbin wound coil is attached to a tempered steel shaft. The upper end of this shaft is a conical pivot and the lower end is a tapered pivot. The upper conical pivot turns in a stainless steel cone bearing which is threaded and adjustable. The lower tapered pivot has 360 degrees of contact with a special semi-solid damping material into which it is imbedded. *To achieve a truly linear damping and compliance action, the damping material is torsionally twisted rather than pinched or squeezed as in conventional systems.*

By utilizing the adjustable cone bearing, the damping material can be compressed or decompressed between the tapered pivot and tapered hole into which the assembly is mounted. This allows a continuously variable adjustment from a locked stylus to a nearly infinite compliance. *In production, the compliance of GRADO cartridges are set to an extremely accurate degree.*

An advantage of this design is that it completely removes from the coil, all but axial movements in the lateral direction. This, plus the elimination of moving iron from within the coil, lowers the distortion content of the cartridge considerably. *Immediately evident is a smooth, definitely defined sound free from false colorations.*

Another important feature of this design is the almost total isolation of the vertical compliance and mass to the stylus tip. By doing this and by increasing the vertical compliance and the lateral compliance, the unsprung weight at the stylus is greatly reduced. The effect of this engineering feat is threefold; an almost total absence of record scratch, needle talk and record wear. This, even though the cartridge is tracking with forces as high as 5 grams. *Diligent research has proven that the reduction of vertical moving mass is a major factor in the reduction of record wear.*

By paying close attention to the total inertia of the moving mass, it was possible to design a cartridge with superb tracking characteristics. Superior tracking results in greatly improved transient response. *Listening wise you hear a new depth and dimensional aliveness that wide frequency and dynamic range alone cannot deliver.*

The GRADO cartridge tracks the most violently complicated signals with absolute ease, thereby allowing you *musical reproduction free from fuzziness or listening fatigue.*

To further reduce record wear the cartridge contains a radium-active static eliminator. This unit aids in rendering *records incapable of statically attracting dust and dirt which could be instrumental in increased record wear.*

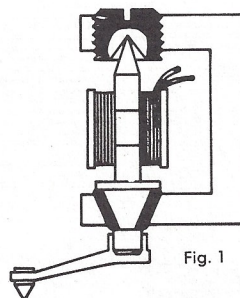


Fig. 1

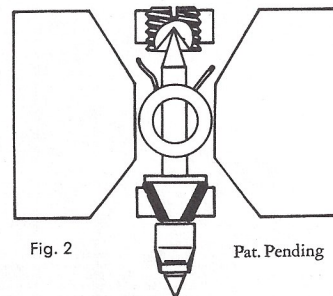


Fig. 2

Pat. Pending

### SPECIFICATIONS

- Frequency response—10 to 28,000 cps\*
- Output—approximately 8 millivolts at 10 cm velocity per second.
- DC resistance—600 ohms.
- Impedance—600 ohms (throughout audio range).
- Tracking force—1 to 8 grams; (for minimum distortion and record wear—4 grams.)
- Weight—approximately 15 grams.
- Compliance—Adjusted to  $15 \times 10^{-6} \pm .5$  DB.
- Input load—1000 ohms to 1 megohm.
- Lateral mass—1.8 milligrams.
- Vertical mass—.1 milligrams.
- IM distortion—2% @ 27 cm velocity: 400 + 4000 cps.
- Static eliminator—Radium active sulphate impregnated in gold and silver. Ionization and static elimination effective to  $1\frac{1}{2}$ ". Half life—1600 years.

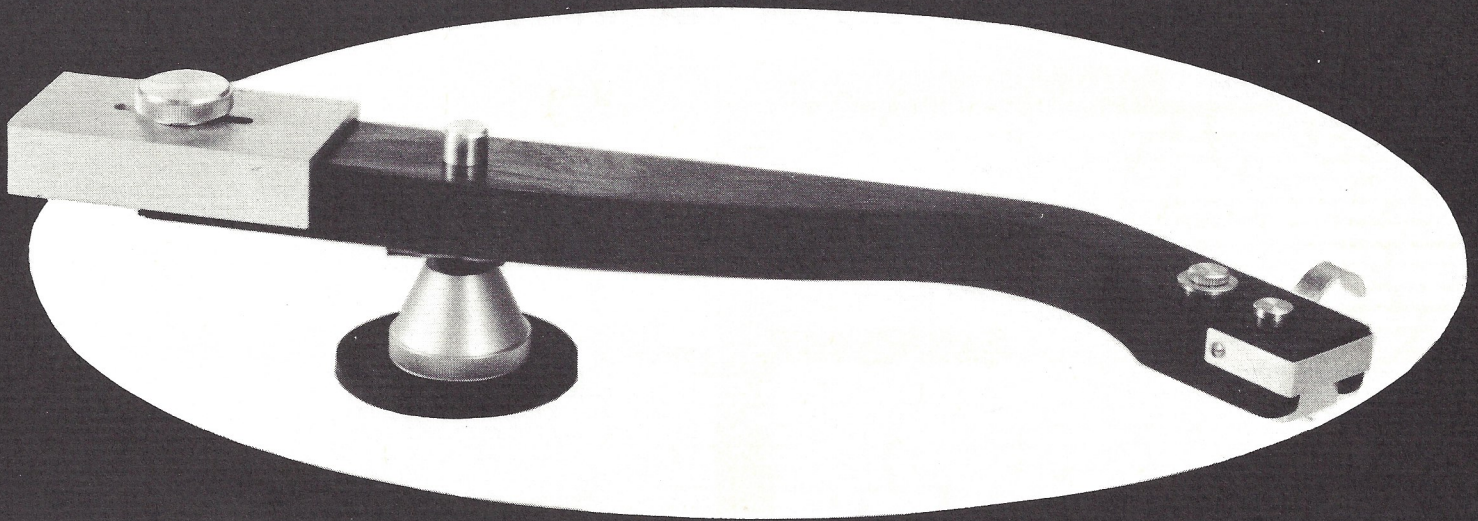
The GRADO cartridge contains the following features:

- Diamond stylus
- Stylus visible for cueing.
- Fits standard tone arms.
- Designed for record changer use.
- Available for 78 rpm.
- Shipping weight 40 grams.

Audiophile Net Price \$45.00.

\*Audio engineers are constantly striving to solve the problems of plastic resonances which take place during record playback. This occurs with even the finest cartridges manufactured today and can be calculated when test records are properly used. The effects of this resonance technically, may be an enormous peak in frequency response within the audible range. Listening effects generally are excessive record scratch and strident sound.

The design of the GRADO cartridge accurately controls the moving mass to substantially reduce the effects of plastic resonances and to move them further out of the audio range. *This results in a superior sound quality never before achieved.*



## THE GRADO TONE ARM

A perfect mate for the Grado phonograph cartridge is the Grado transcription arm.

This tone arm is constructed of the finest gunstock walnut wood and is hand rubbed to bring out the natural beauty of the wood grain. The metal fittings are of finely machined anodized aluminum.

The Grado transcription tone arm is precision crafted for maximum accuracy. Its one piece construction eliminates the possibility of intermittent masses which cause instability and erratic resonances. *These resonances cause a reduction of dynamic range and a loss of bass response.*

By utilizing a special micrometer overhang adjustment, the audiophile may adjust the Grado tone arm for the smallest possible tracking error, thus minimizing tracking distortion to a near vanishing point. *The listening effect is one of greatly improved dimension, one that approaches a true stereophonic quality.*

A one knob adjustment provides the proper tracking force for most popular cartridges.

The lateral pivoting of the arm consists of a precision ball thrust bearing, similar to that used in the finest professional turntables. *This shaft and bearing assembly is designed to effectively damp out the low frequency resonance which occurs at 10 cps.*

The vertical pivoting consists of spring loaded beryllium copper bearings working with hardened cone pivots. This arrangement allows for zero pivot play with very low frictional resistance at the cartridge stylus. This pivot and bearing assembly is self adjusting and will maintain zero pivot clearance automatically. *In addition the vertical pivoting is mounted at right angles to a straight line between the lateral pivot and stylus centers, thereby attaining maximum stability.*

Used with the Grado cartridge one may enjoy the absolute finest in recorded music. *Used with any cartridge one will notice a marked improvement in sound and a decrease in record wear.*

### SPECIFICATIONS (with GRADO cartridge)

- Tracking error  $\pm .8^\circ$ .
- Resonance—10 cps approximately + 3DB.
- Micrometer overhang adjustment  $\pm \frac{1}{4}$ ".
- Height adjustment  $1\frac{1}{4}$ ".
- Stylus force adjustment  $\pm 7$  grams.  
(Mean adjustment: 6 grams force for a 12 gram cartridge)
- Arm length: lateral pivot to stylus centers  $8\frac{7}{8}$ ".
- Overall length: 13".
- Offset angle:  $24.5^\circ$ .
- Pivot frictions: under .1 gram at stylus.
- Audiophile net price \$29.95.
- 16" transcription tone arm net price \$32.50.
- Shipping weight: 12", 1 lb. 9 oz., 709 grams.
- Shipping weight: 16", 1 lb. 12 oz., 794 grams.
- Wired for stereo cartridges.

## GRADO TRANSFORMER

A high quality transformer for increasing the output of low level phonograph cartridges. Supplied with input lead.

### SPECIFICATIONS

- Frequency response: 10-30,000 cps.  $\pm 1$ db.  
(with 600 ohm primary source; terminating transformer into 47,000 ohms).
- Hum level —90db.
- Distortion unmeasurable with 40MV input.
- Shipping weight 14 oz., 397 gr. Audiophile net \$15.00.

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**CALIBRATED LABORATORY SERIES CARTRIDGE** — A specially calibrated phonograph cartridge completely hand finished and of extremely high quality. Supplied on special order only. Shipping weight 60 grams. Net price \$75.00.

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# TESTED IN THE HOME

REPRINTED FROM HIGH FIDELITY — OCTOBER, 1957

## THE GRADO PICKUP

**SPECIFICATIONS** (furnished by manufacturer): a single-stylus moving-coil magnetic pickup. **Frequency range:** 10 to 28,000 cps. **Output:** 6 mv @ 10 cm/sec groove velocity. **Impedance:** 600 ohms. **Recommended load:** above 5,000 ohms. **Lateral compliance:**  $15 \times 10^{-6}$  cm/dyne. **Tracking force:** 1½ to 5 grams. **Total weight:** 15 grams. **IM distortion:** below 2% @ over 5 times normal recorded level. Built-in radioactive static charge neutralizer, 7 mr/hr intensity at source; estimated half life 1,600 years. **Price:** \$45. **INPUT TRANSFORMER** — **Frequency response:**  $\pm 0.5$  db, 10 to 30,000 cps. **Harmonic distortion:** unmeasurable at 40 mv input, over the rated frequency range. **Hum level:** — 90 db, rel. 1 v. **Price:** \$15. **MANUFACTURER:** Grado Laboratories, 4614 Seventh Avenue, Brooklyn 20, N. Y.

At the time of writing this report, the Grado pickup is notable for having the highest lateral compliance specification of any magnetic pickup, and I must confess that I at first viewed this remarkable rating with some misgivings. Extremely high compliance in a pickup usually sets rather stringent requirements for the arm it is to be used in, and almost invariably precludes using it in a changer. The Grado's full compliance, however, is stated to be effective only through a few degrees of stylus swing, and decreases rapidly at larger excursion. Thus, its compliance is high only as far as record groove modulation is concerned, but when the cartridge is subjected to relatively severe lateral pressure, it yields only so far, and no further. As a result, I found that this pickup would track admirably at 3 grams in a good record changer, yet would actuate the trip mechanism without visible twisting of the stylus.

The Grado's plastic stylus cantilever strip extends far enough forward that it is readily visible to the operator, for easy and accurate groove spotting, and the cantilever's length and flexibility provide very high vertical compliance, as well as low effective vertical mass. These factors are no doubt largely responsible for the Grado's gentleness to records and its almost complete absence of needle talk, although its high lateral compliance and low lateral mass are contributing factors, too.

Measurements on the Grado indicated very smooth response from 20 to 1,500 cycles, a broad dip amounting to perhaps 1½ db from 2,000

to 5,000 cycles, and back to normal again at 6,000. It stayed within about .1 db of flat to around 18,000 cycles, and above that I cease to trust our test records. These measurements, as well as the Grado's ambitious specifications, were reflected in its sound, which is outstandingly clean, smooth, and transparent. It's bass end is clean, detailed, and perhaps a little on the heavy side, and its over-all sound is sweet and uncolored, giving excellent reproduction of musical timbres. The pickup tracks very heavy modulations with ease, while its slight upper-middle-range response dip tends to reduce record surface noise and simultaneously counteracts some of the excessive brilliance in many speaker systems.

Since the Grado's output is low, it may be necessary to use its input matching transformer when feeding some limited-gain preamp-control units. There need not, however, be any concern about sonic deterioration due to the transformer; I could neither measure nor hear any qualitative difference between the pickup alone and the pickup with its transformer, and the transformer is exceedingly insensitive to inductive hum interference.

The Grado is a new item in the high fidelity field, so as always, I must append the reservation that only time will tell how well it withstands the rigors of hard usage. I found no trace of deterioration during the six weeks I used it, so I see no good reason to doubt its dependability over longer periods of time.—J.G.H.

**MANUFACTURER'S COMMENT:** Since the quality and range of any pickup's bass response is largely dependent upon the tone arm used, there will be observable differences in the sound of a cartridge when it is used with different arms. In a good arm, the Grado cartridge resonates at about 6 cycles, and at 10 cycles in 2.5 decibels above the 1,000-cycle reference level.

In a less satisfactory arm, this resonance may occur at a higher frequency and may be more severe, and even though extremely low frequencies cannot be heard as steady tones, they can and will color the over-all sound. Therefore, a good pickup arm is just as important as a good pickup cartridge.

## EQUIPMENT REVIEW

REPRINTED FROM AUDIO — SEPTEMBER, 1957

### GRADO PHONO CARTRIDGE

One sometimes wonders when improvements in phonograph cartridges will ever end—for with each new model that is introduced one must assume—rightly or wrongly—that the manufacturer believes his is better than any other or he would not enter into the commercial market until he had perfected it. The Grado—as of this moment is the newest to be introduced—has a number of features which place it among the top few in the pickup category.

The new pickup is simple and attractive in appearance. It has a black plastic body with a brushed chrome cover over the operating mechanism. Departing from the usual practice for top-quality pickup, this model was designed to be used in a changer, although naturally it will function in professional arms just as well or even better. The lower surface of the housing is fitted with a small piece of radium active sulphate impregnated in gold and silver, and this material deionizes the record surface, serving as a static eliminator and reducing dust collection. The radioactive material is recessed so as to avoid contamination of its surface by oil from the skin from touching it, and to prevent possible injury to the user from its radioactivity. The cartridge fits all standard pickup heads, and is equipped with two friction slip-on contacts for the electrical connections.

The Grado is a moving-coil unit, and internally it differs considerably from other models. The coil is wound on a subminiature bobbin which is rotated in the magnetic field by movement of the tempered sheet shaft which serves as its axis. This shaft has a conical pivot at the top seating in a stainless steel cone bearing which is threaded and adjustable, as may be seen in Fig. 7, which shows sectional views from front and side. The lower end of the shaft is a tapered "pivot" which seats in a semi-solid damping material. By adjusting the upper cone bearing—a simple procedure because of the threading—it is possible to vary the compliance of the stylus over a wide range. Tightened up completely, the compliance is zero; loosened, it may be increased almost to infinity. This adjustment is not left to the user but it made at the factory to an accurate degree. The stylus arm is a plastic material, and the design is such that all of the vertical compliance is confined to this arm. The coil itself cannot possibly be moved vertically, and thus none of the vertical movement of the stylus is converted into electrical energy as it rides the grooves. Thus there is no distortion arising from this source, and it is claimed that elimination of any moving iron in the magnetic field serves still further to reduce distortion.

In any case, the sound quality of this new Grado pickup is pleasant,

to say the least. Measured frequency response covers all of the test records at our disposal with  $\pm 1$ db variation from 20 to 20,000 cps, even

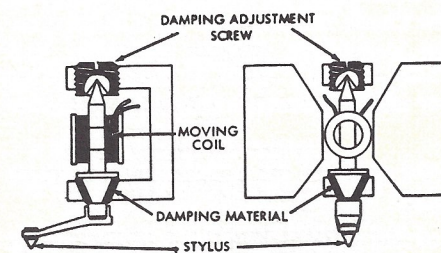


Fig. 7. Diagram of internal elements of the Grado cartridge.

though the manufacturer quotes a higher figure for the top end. Actually, there is little doubt about this, for there is not any beginning of rolloff even at 20,000 cps, and the sine wave reproduced from the Cook Series 10 (78) test record was exceptionally pure at that frequency. Claimed response is to 28,000 cps, and with no peak or rise in output as far as 20,000 we would be inclined to believe this figure.

Listening tests were made using the Grado in a high-quality professional arm with a similarly high-quality turntable, and in a conventional record changer. There is no doubt that the pickup is smooth and free from distortion, and while we first thought it was slightly dull, we are convinced that this apparent dullness is due to the complete absence of any peak in response up to the limit of our hearing, at least. While it is, to say the least, a subjective description, the quality of reproduction might be termed "silky." Most listeners will agree that there is some coloration to any pickup—due to minor resonances, undoubtedly—which make it possible to identify the pickup solely from its sound. The Grado would have been identified by the complete absence of any coloration, resulting in a very high listening quality.

To the other side of the picture, it must be noted that the output is relatively low—approximately 6 millivolts for a stylus velocity of 10 cm/sec. This requires that the gain of the amplifier be increased, and in some instances the increase in hum output because of the amplifier controls being turned up higher might be disadvantageous. However, many amplifiers perform satisfactorily with inputs as low as this, and the pickup should not be judged by the equipment with which it is used. Used under proper conditions, the Grado should be considered highly satisfactory by any listener.