

*Stirling* SE

*Estd.* **TANNOY** 1926

# Stirling<sup>SE</sup>

In combining the best of traditional crafts and the latest production and design skills Tannoy presents the Stirling SE loudspeaker. The Stirling SE embodies the Tannoy philosophy. Cabinets in selected hardwoods are hand finished and polished to a standard that is unsurpassed.

The Stirling SE is a compact high performance loudspeaker based around Tannoy's unique 10-inch ribbon wound Tulip WaveGuide™ twin-magnet Dual Concentric™. Signal handling is by gold-plated terminals with captive link bi-wire/normal wiring and a hard-wired time compensated crossover network. The Stirling SE offers high frequency energy tailoring through a high current gold-plated switch block. Silver plated copper Van den Hul wiring is used throughout, together with specially selected high quality crossover components. The specially designed twin-roll impregnated fabric surround used on the drive unit's cone, ensures midrange purity combined with tight, controlled bass.



## *Tannoy - A Short History*

In the early days of broadcasting radio sets needed both low and high voltage DC power that had to be supplied by batteries. The lead acid batteries used in the radio sets of the time needed regular recharging.

In London, in 1926, Guy R. Fountain perfected a new type of electrical rectifier with the aim of designing a charger more suitable for use in the house. His rectifier consisted of two dissimilar metals held in a special electrolyte solution. One metal was Tantalum and the other an alloy of Lead. So successful was this invention that Guy Fountain founded a British Company called Tannoy (a contraction of the words 'Tantalum' and 'Alloy'). Tannoy soon became internationally known and highly regarded in all aspects of sound reproduction.

Moving coil loudspeakers with DC energised magnets began Tannoy's continued success in the field of loudspeaker technology. A discrete two-way loudspeaker system followed in 1933 and shortly after a range of microphones and loudspeakers capable of high power handling.

Tannoy has always been at the front of the communications revolution, developing its own equipment and production technology. The company built a fund of knowledge and experience, that has proved invaluable in the development of loudspeakers for a truly wide range of applications. The now famous Tannoy Dual Concentric™ principle was created and developed under Guy Fountain's direction around 1950. It is highly regarded by music enthusiasts, and recording and broadcast studios because of its unique properties in faithfully reproducing sound to an unusually high quality standard.

Guy Fountain retired from the company in 1974 but the Tannoy company continues his philosophy dedicated to the accurate and realistic reproduction of music for both enthusiasts and professionals around the world.

The Tannoy Research and Development unit has further refined the innovative Dual Concentric™ principle. Using the latest design and material technologies, with sophisticated circuit techniques in crossover design, Tannoy has produced a loudspeaker system with superb reproductive capabilities and exceptionally wide dynamic range.

Tannoy is now part of the TG Group, whose goal is to design, produce and distribute the best engineered, most recognised and respected brands of audio products in the world.

## *Unpacking Instructions*

Unfasten the bottom of the carton. Fold the end leaves out of the way and remove the packing tray to reveal the plinth and bottom of the loudspeaker cabinet. Locate and remove from the carton the accessories pack. Turn the carton and loudspeaker over so that the cabinet now stands on the floor inside the carton. Lift the carton upwards to reveal the loudspeaker.

Examine all pieces of packing material and inspect the carton for signs of external damage. If there is evidence of excessive damage to the packaging and resulting damage to the loudspeaker inform the carrier and supplier immediately. Always keep the packing in such circumstances for subsequent examination.

Tannoy strongly suggests that you store the complete packaging set for possible future use.

## *Initial Positioning*

The Stirling SE is a floor-standing speaker and therefore does not require a separate stand. To get a detailed sound with a 'fast' bass and accurate stereo imaging it is necessary, however, to 'fix' the loudspeakers at a point in space.

Holes are provided in the base of the speakers for down-spikes that give maximum stability. Special floor-coupling spikes are provided and these should be screwed into the base of the loudspeakers, taking care not to over-tighten them. When the loudspeaker is installed in its upright position, the spikes should pass between the weave of your carpet to contact the floor beneath.

For polished wood floors, hard nylon self-levelling 'ball-and-cup' feet are provided.

Locate the loudspeakers so that the favourite listening position is approximately 15° from the axes of the cabinets. The axes of both cabinets should intersect at a point slightly in front of the listening position. Remember that the proximity of the loudspeakers to walls and corners will affect the sound. Some experimentation will probably be needed to fine tune the stereo image depth and low frequency sound quality. Close-to-wall positions - and room corners more so - have the effect of increasing very low frequency sound energy. Reflective adjacent walls may upset the stereo image by causing unwanted reflections.

The loudspeakers are designed to be used at least 1m from any side wall or reflective surface and at least 0.5m (20") away from a rear wall. Only in this position will their exceptional stereo image depth capabilities be realised.

## *Amplifier Connections*

Connect the loudspeakers to the amplifier using a high quality speaker cable. Your dealer will be able to make recommendations. The terminals will accept either spade or banana plugs.

Arrange the connections so that the right hand amplifier channel terminals are connected to the right hand loudspeaker as viewed from the listening position.

Correct polarity of the connections between the amplifier and speakers is essential. The positive terminal on the amplifier left channel, marked +(plus) or coloured red, must be connected to the positive terminal on the left loudspeaker. The negative terminal on the amplifier left channel, marked - (minus) or coloured black, must be connected to the negative terminal on the left loudspeaker.

Repeat this connection for the right speaker.

Good quality cables and tight, well-made connections are necessary to eliminate resistive losses and maintain the correct damping of the loudspeaker by the amplifier.

If the cables and connections have been made correctly as described above the loudspeakers will be automatically in phase with each other. However if phasing is felt to be incorrect (for example, diffuse stereo image, lack of bass) then apply the following test:

Place the loudspeakers side by side and play a monophonic signal from the amplifier, choosing the programme material with a strong bass content. If phasing is correct bass will be full and rich. If incorrect there will be very little bass due to cancellation effects. Incorrect phasing can be remedied by reversing the connecting leads to one loudspeaker (at either the amplifier or the loudspeaker terminals but not both).

**Note:** Be certain to ensure that the amplifier is switched off when connecting or disconnecting loudspeaker leads. Accidentally shorting the loudspeaker leads together can damage some amplifiers. Such damage is outside warranty provisions.

## *Bi-Wiring Theory*

Loudspeakers need power signals to produce acoustic energy when reproducing music. The range of electrical currents passing down the cable from the amplifier to the loudspeaker is very wide. In decibel terms this is called the dynamic range. Modern loudspeakers are capable of resolving a dynamic range of at least 80dB with a suitable power amplifier.

An 80dB dynamic range corresponds to voltages of between 50 Volt and 0.005 Volt at the loudspeaker terminals or equivalent currents of between 0.0006 and 6 Amp. This is a truly wide range of electrical signals to pass down one cable without some interactions causing a loss of resolution in the very small signals.

When electricity passes down a wire or cable, what does in at one end is unfortunately different from what comes out at the other. The degree of loss or modification of a signal depends on the physical characteristics of the cable and the nature of the signal. Heavy electrical currents flowing down thin conductors cause heating effects. Very high frequency signals passing along conductors or cables of certain lengths cause electromagnetic radiation effects (aerials). Electrical cables are selected for minimum loss and maximum information resolution considering the type of electrical signals they are designed to carry.

A good solution to the problem is to 'bi-wire' the loudspeakers to the amplifier. This means providing two separate sets of cables from the power amplifier to each loudspeaker and dividing the electrical signals into high current, 'slow' signals and light current, 'fast' signals. Of course, the loudspeaker must be fitted with two pairs of terminals to take the two sets of cables; your Tannoy loudspeakers are of course equipped for just this type of connection.

## *Bi-Wiring*

Bi-wiring releases the full potential of the Tannoy Prestige loudspeakers. Two complete sets of cable are required.

Switch the amplifier off. Deal with each 'side' of the system separately. Label two of the cables Left LF and Left HF (low frequency and high frequency).

Label two of the cables Left LF and Left HF (low frequency and high frequency). Do the same for the right pair. Undo the loudspeaker terminals, remove and retain the Bi-wiring links so that the same polarity terminals are no longer joined.

It is essential to get the polarity correct. If your amplifier does not have separate output terminals for bass and treble then, at the amplifier end of the cable, connect the Left LF+ and HF+ cables together. Then wire to the amplifier Left channel positive terminal marked + (plus) or coloured red.

Connect the Left LF- and HF- cables together to the amplifier negative terminal marked - (minus) or black.

Note the polarity marking on the cable. At the loudspeaker end connect the cables marked Left LF+ and LF- to the appropriate left speaker LF terminals. Connect the Left HF+ and HF- to the appropriate + and - left speaker HF terminals.

Make the same connections with the Right LF and HF cables.

For optimum performance, the earth connection on the terminal panel should be connected to the amplifier chassis earth or other ground point. This screening effect can give an improvement in detail clarity, depending on the amplifier used.

Optimum results are achieved using a screened loudspeaker cable designed for such a system. such as the Tannoy TLC.

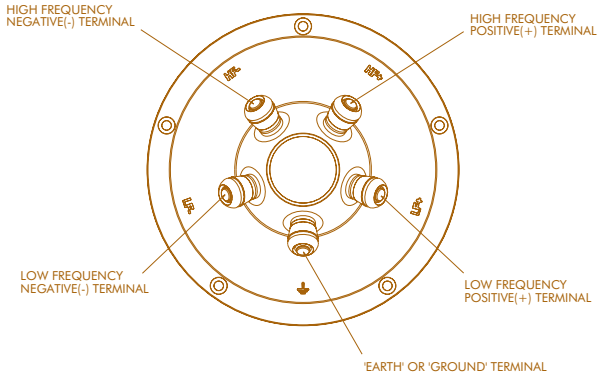
Switch on the amplifier with the volume turned down. Select a favourite source and carefully turn up the volume. Check that bass and treble sounds come from both speakers. If not, switch off and remake the connections.

## *Cables*

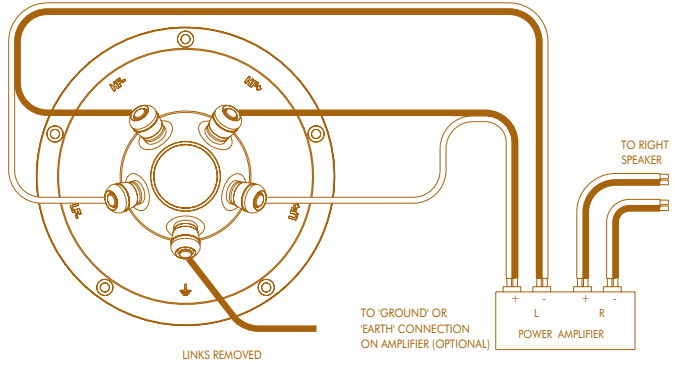
High quality audio signals passing from power amplifier to loudspeaker are unusual in their demands on cable. Frequencies from 20Hz to 20kHz (10 octaves or a ratio of 10,000:1) and currents of 80dB dynamic range (again a ratio of 10,000:1) have to coexist.

The cable also has to be capable of transmitting peak currents of at least 10 Amp without causing losses greater than 0.001 Amp (10 Amp divided by the ratio 10,000). These strict requirements on loudspeaker cables help explain why the sound quality from loudspeakers is so dependant on the physical properties of the cables connecting them to the power amplifier.

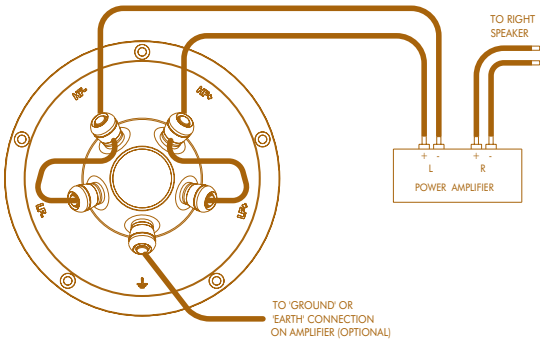
**FIG. 1** TERMINAL PANEL



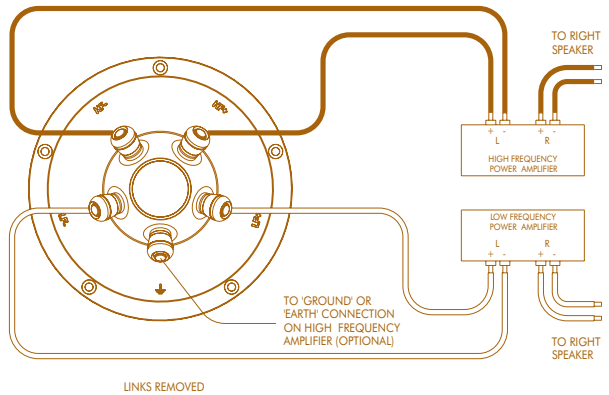
**FIG. 2** BI-WIRE MODE



**FIG. 3** SINGLE WIRE MODE



**FIG. 4** BI-AMPING MODE



## *Grille Removal*

Special acoustically transparent cloth is used in the grilles. However, for ultimate fidelity the enthusiast will find it is best to use these loudspeakers with their grilles removed during listening.

The large front grille is removable for access to the front panel controls. Insert the key provided into the lock at the bottom of the main grille assembly and turn anti-clockwise to release. Pull the bottom of the grille away from the cabinet; the grille will drop down from its upper location. Take care not to damage the solid walnut lower part of the cabinet. To replace the grille engage the top of the grille into the slot in the cabinet and push the grill into the recess. Apply slight pressure to the bottom whilst turning the key clockwise to engage the lock.

## *Loudspeaker System Adjustment*

Each loudspeaker is fitted with a treble energy control located on the baffle beneath the detachable front grille. This high current switch block control can be used to compensate for the varied acoustic characteristics of listening rooms. The control should be adjusted with the amplifier tone controls set to the 'flat' or uncompensated position. Each loudspeaker should be adjusted individually. This is most easily done by rotating the amplifier balance control to select first one loudspeaker and then the other.

The Energy control has five positions. It allows the output of the high frequency compression drive unit to be increased or decreased from the linear or 'flat' position over a frequency band from approximately 2kHz to 20kHz. The control has a shelving effect over the 2kHz to 20kHz frequency band.

The flattest most linear response from the loudspeaker will be obtained with both controls set at the LEVEL position, and this position should be used for initial listening tests. If the overall high frequency sound quality seems too prominent the -1.5 or -3 positions for the energy control should be tried. If the sound appears subdued in the treble region +1.5 or +3 settings may be preferred.

Remember the changes that can be made by moving either control from one position to another are subtle. They may not easily be heard if the programme material has very little content in the frequency band under consideration. Choose a well balanced piece of music with a full spectrum of sound.

The correct setting will be found when the loudspeakers are no longer evident and only the musical performance is heard.

## *Running in*

Like all loudspeakers, the drive unit in your Stirling SE requires a while to reach optimum performance, as the stresses in the materials relax - especially in the suspension system. For this reason, it is beneficial to run the system at fairly high levels at normal room temperature, for approximately 20 hours to achieve best results.

## *Tannoy Dual Concentric™ Drive Unit with Tulip Wave Guide™*

The Tannoy Dual Concentric™ has three fundamental advantages over conventional discrete systems. The Dual Concentric™ driver is a coincident acoustic point source, it has a very wide dynamic range potential and constant symmetrical directivity.

The high frequency unit is mounted behind, and concentrically with, the low frequency unit. High frequency sound radiates from the centre of the low frequency unit through a computer designed wave guide. By careful mechanical and crossover network design the virtual acoustic sources of the high and low frequency units can be made to occupy the same point on the axis. Therefore the total sound appears to emanate from a single point source located slightly behind the drive unit. This gives the Dual Concentric™ driver a coincident acoustic point source. This feature allows the Dual Concentric™ driver to generate a full and accurate stereo image when fed from a high quality stereo source. Realism in sound reproduction is enhanced as the drive unit both preserves the harmonic structure of complex sounds and provides a linear phase response.

The key to the controlled, symmetrical radiation pattern of the Dual Concentric™ is the new Tulip WaveGuide™. This computer designed high frequency wave guide - named for its similarity in cross-section with the flower - ensures that spherical wavefronts are created from the high frequency section to match those from the low frequency driver. A truly spherical wavefront is generated across the spectrum.

This gives optimum, natural dispersion and directivity. Constant directivity means that no particular room modes are excited. Tannoy Dual Concentric™ systems therefore exhibit easy integration with real rooms.

A new aluminium high frequency dome tweeter is used in the Tulip WaveGuide™ version of the Dual Concentric™ driver. This gives a smoother, more extended treble and further reduced high frequency colouration.

There are other significant advantages in having the high frequency unit within the low frequency section. The high frequency unit does not obstruct the low frequency unit in any way (a unique feature when compared with other so called coaxial systems). Polar dispersion of sound is symmetrical in both horizontal and vertical planes giving constant symmetrical directivity. The advantage here is the constant integration of room energy. This means that a Dual Concentric™ loudspeaker is less critical of room boundary proximity. Off-axis listeners benefit from the lack of a stereo "sweet spot" and the maintenance of the full midrange energy spectrum off-axis.

The Tannoy Dual Concentric™ can handle the very widest dynamic range material faithfully. It presents an undemanding current requirement to the driving amplifier yet has a fast rise time and is capable of high sound pressure levels. The thermal mass and power dissipation of the design guarantees low acoustic compression at high power outputs. This adds to the realism and dynamic excitement of the sound produced.

## *The Crossover Network*

During the design of the crossover network the acoustic, mechanical and electrical interactions of the high and low frequency sections have been fully analysed. The crossover is therefore an integral part of the design of the system. The crossover network provides complex equalisation in both amplitude and phase for each section and fully integrates the response at the crossover point. All components are high precision, low-loss and thermally stable.

All components in the crossover network are hard wired to eliminate unwanted metal-to-metal contact and ensure freedom from vibration. The components are laid out to minimise inter component coupling and are placed well away from the driver magnetic field. Top quality silver plated Van den Hul wiring is used throughout.

High current switch blocks with gold-plated screw terminals permit user adjustment of high frequency sound radiation to suit differing listening environments.

The complementary design of crossover and drive units means that the loudspeaker system as a whole behaves as a minimum phase system over the audio band and therefore the acoustic sources of the high and low frequency sections are aligned in time and space to ensure accurate reproduction of stereo images.

## *A Note on Auditory Perception*

Our hearing mechanism locates natural sound sources with great accuracy by using the naturally occurring phase differences (or arrival times) at middle frequencies, and intensity differences at higher frequencies, between each of our ears. Naturally occurring sounds pass through the air to the ears at constant speed (345 metres/second or 1132 feet/second). All frequencies travel at the same speed and therefore a frequency independent time delay is associated with the distances involved. (The familiar time delay between a flash of lightning and the associated clap of thunder is an example).

Human hearing relies on the constant nature of the time delay with the intensity to locate natural sounds accurately. A pair of Tannoy Prestige loudspeakers can uniquely reconstruct stereo images and provide excellent localisation of recorded sounds. The Tannoy Dual Concentric™ principle ensures that the source of sound at high frequencies is on the same axis as the source of sound at low frequencies.

The careful design of crossover network complements the drive unit to provide a coincident sound source at frequencies where the human ear derives phase information for localisation. The loudspeaker system exhibits a time delay response that is in essence independent of reproduced frequencies. In addition, the amplitude (or intensity) response is linear, smooth and consistent. This provides the correct intensity information to recreate the original sound stage.

## *Care of the Cabinet*

The cabinet is constructed from carefully selected solid walnut and walnut veneers that have been hand waxed before dispatch from our finishing workshop.

To maintain the natural wood appearance it is important that only a wax of similar formulation is used.

A jar of specially formulated wax is included with each loudspeaker. This wax should be applied very sparingly with a soft lint-free cloth (muslin for example) taking great care to avoid putting wax on the grille material. Work the wax into the wood covering a small area at a time.

In common with all solid wood furniture, exposure to extremes of heat, cold and varying humidity will cause the wood to ease slightly. Therefore it is recommended that the loudspeaker is protected from environmental extremes to guard against any such occurrence



## *Faultfinding*

Tannoy loudspeakers are designed and manufactured to be reliable. When a fault occurs in a hi-fi system the effect is always heard through the loudspeakers although they may not be the source of the fault. It is important to trace the cause of the problem as accurately as possible.

A fault heard on one source (only CD or tape for instance) is most unlikely to be a loudspeaker problem. Loudspeakers do not generate hum, hiss or rumble although high-quality, wide-bandwidth loudspeakers may emphasise such problems.

## *Tannoy Quality*

An important part of Tannoy's design philosophy is to produce loudspeakers with a level of performance beyond the most exacting specifications of contemporary source equipment.

Loudspeaker design is no longer a 'black art'. It is now possible to use computers to model designs and predict results. Comprehensive test equipment is used to pin-point problems with cabinets or drive units; anechoic chambers help in producing accurate measurements. Computer aided design (CAD) and sophisticated test equipment are used extensively at Tannoy but we always remember that listening tests must be the final judge.

Tannoy follows a policy of stringent quality control procedures using sophisticated measurement facilities. Strict quality control is more easily achieved because all the loudspeakers are built in-house at the Tannoy factory in Scotland. All drive units are designed and manufactured by Tannoy. All incoming parts are thoroughly tested to ensure that they are as specified. Not only is all data computerised but CAD ensures every loudspeaker meets or exceeds our exacting standards

## *Warranty and Service*

Tannoy Prestige loudspeakers will operate for many years without trouble provided they are cared for as instructed.

Tannoy Prestige loudspeakers are warranted against manufacturing defects in material or craftsmanship over a period of 5 years from the date of purchase. This warranty is in addition to your statutory rights as a customer. Tannoy cannot however be held responsible for failures caused by abuse, unauthorised modifications, improper operations or damage caused by faults elsewhere in your system.

The determination of the cause of failure will be made by Tannoy Ltd or its authorised Distributor or Service Agent based on physical inspection of the failed parts.

If you suspect a problem with your loudspeakers then in the first instance discuss it with your Tannoy Dealer. The Dealer has the expertise and experience to help you troubleshoot the system and assess the situation.

If you continue to have problems contact your Tannoy Distributor or Tannoy Customer Services at our Coatbridge address.

Due to our policy of continuous improvement, all specifications are subject to change without notice.

## *Caution*

The high peak power handling of Tannoy loudspeakers will allow responsible use with larger amplifiers on wide dynamic range material.

Take care with any amplifier, irrespective of power output, to avoid abnormal conditions such as switch-on surges or output overload (clipping) that may result in peaks of power greatly over the rated output.



## Technical Specifications

### PERFORMANCE

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<b>RECOMMENDED AMPLIFIER POWER</b>	30 - 150 Watts per channel
<b>POWER RATING</b>	95 Watts RMS 225 Watts peak
<b>MAXIMUM SPL</b>	111 dB (95 Watts RMS/1m) 114 dB (225 Watts peak/1m)
<b>SENSITIVITY</b>	91dB (2.83 Volts @ 1m)
<b>NOMINAL IMPEDANCE</b>	8 Ohm
<b>FREQUENCY RESPONSE</b>	35Hz - 25kHz
<b>DISPERSION</b>	90 degree conical
<b>TOTAL HARMONIC DISTORTION</b>	Less than 1.75% at 95 Watts RMS (50Hz - 20kHz)

### DRIVE UNIT

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<b>DRIVER TYPE</b>	254mm (10") Dual Concentric™ utilising paper pulp cone with twin roll impregnated fabric surround
<b>LOW FREQUENCY</b>	42mm (1 <sup>5</sup> / <sub>8</sub> ") edge-wound voice coil
<b>HIGH FREQUENCY</b>	25mm (1") edge-wound voice coil

### CROSSOVER

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<b>CROSSOVER TYPE</b>	Bi-wired, hard-wired passive, low loss, 2nd order compensated LF. 2nd order HF
<b>CROSSOVER FREQUENCY</b>	1.8kHz
<b>ADJUSTMENTS</b>	+/- 3dB over 1.8kHz to 25kHz shelving

### CABINET

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<b>ENCLOSURE TYPE</b>	Distributed port
<b>VOLUME</b>	85 litres (3 cu. ft.)
<b>DIMENSIONS</b>	850mm (33 <sup>1</sup> / <sub>2</sub> ") x 397mm (15 <sup>5</sup> / <sub>8</sub> ") x 368mm (14 <sup>1</sup> / <sub>2</sub> ") (H x W x D)
<b>WEIGHT</b>	23 kilograms (50.75 lbs)
<b>CONSTRUCTION</b>	Walnut veneered 18mm (3/ <sub>4</sub> ") particle board Solid walnut edging

### PACKAGE DETAIL

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<b>DIMENSIONS</b>	940mm (37") x 475mm (18 <sup>3</sup> / <sub>4</sub> ") x 445mm (17 <sup>1</sup> / <sub>2</sub> ") (H x W x D)
<b>WEIGHT</b>	27 kilograms (59.5 lbs)





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