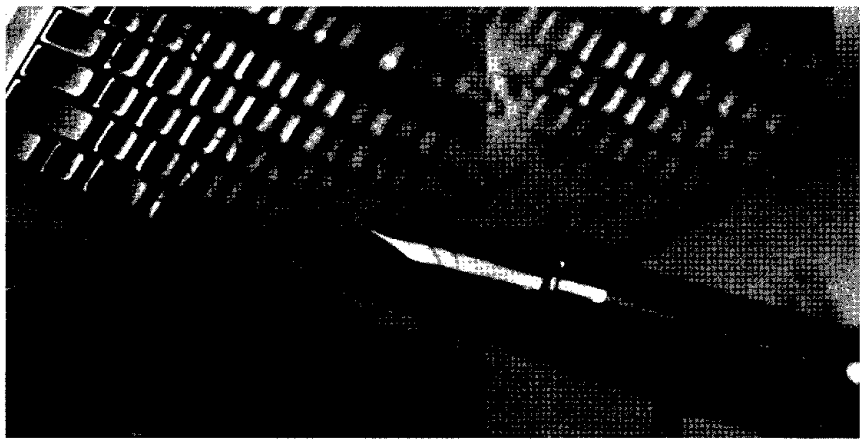
RESEARCH REPORT

NOISE ISOLATION PROVIDED BY GYPSUM BOARD PARTITIONS

FINAL REPORT



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Report submitted January 11, 2002 to

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NOISE ISOLATION PROVIDED BY GYPSUM BOARD PARTITIONS

EXECUTIVE SUMMARY

The CANADA MORTGAGE AND HOUSING CORPORATION has commissioned MJM ACOUSTICAL CONSULTANTS INC. to analyse the results of 350 sound transmission tests conducted on gypsum board partitions of various compositions. The results of these tests were published in report n° 761 produced by the INSTITUTE OF RESEARCH IN CONSTRUCTION of the NATIONAL RESEARCH COUNCIL OF CANADA. This report conveys the conclusions of our analysis; it highlights the main factors influencing the performance of gypsum board partitions: the gypsum boards themselves, the studs and stud arrangements, the resilient furrings, and the sound absorptive materials inserted in the cavity.

The following conclusions were reached:

- From one manufacturer to the next, there are small variations in terms of the surface mass for the same type of gypsum boards with the exception of 13 mm type "X" boards where a maximal variation of 1.6 kg/m^2 (0.32 lbs/ft^2) was noted. Such a small variation in surface mass translates in a variation of approximately 2 dB in the sound transmission loss of partitions constructed with equivalent gypsum boards made by different manufacturers, except around the critical frequency[1] of the gypsum panels where a 5 dB variation can be observed.

- Generally speaking, the STC rating of a partition increases proportionately to the surface mass of the gypsum boards used in its construction. However, around the 1000 Hz to 3150 Hz range, better transmission losses are generally obtained using thinner gypsum boards for which the critical frequency is higher than that of thicker boards. The best compromise is to use a thinner gypsum board (better transmission loss at higher frequencies)

1 Critical frequency: The lowest frequency at which the length of the bending waves in a material is the same as that of the sound waves in the air; it is at the critical frequency that a material irradiates sound most effectively.

whose surface mass is sufficiently heavy to avoid substantially reducing the transmission loss at low frequencies and hence the STC rating. Based on the results of this study it seems preferable to build a sound isolating partition using 13 mm type "X" gypsum boards rather than 16 mm type "X" boards.

- With the exception of partitions built with single wood studs without resilient furrings, there is an approximate 5 point STC rating increase each time the gypsum boards are doubled on either side of the partition. At low frequencies, the transmission loss is increased by about 5 dB for every doubling of the gypsum boards on one side of the partition. As the frequency rises however the increase becomes less obvious and can be nil in certain cases at high frequencies; this could be due to a mechanical coupling occurring between the two sides of the partition, or it could also be due to a mass-air-mass resonance created by a thin layer of air between the two layers of gypsum boards composing each side of the partition, (where the joints of the two sheets of drywall overlap for example).

- For a single stud partition constructed with one 16 mm gypsum board on one side and two 16 mm boards on the other side, replacing one 16 mm gypsum board by a 13 mm gypsum board on the side of the partition where the gypsum is doubled did not produce significant changes in the STC rating, but provided a slight improvement in the TL of the partition around the critical frequency of the gypsum boards.

- The spacing of the studs has practically no effect on the acoustical performance of single stud partitions (metal or wood, with or without resilient furrings) whose cavity contains no sound absorptive material, or of a double wood stud partition. However, when the cavity of a single stud partition (metal or wood, with or without resilient furrings) is filled with glass fiber, a higher STC rating is obtained when the studs are spaced at 610 mm on center rather than at 406 mm on center. The same is true for staggered wood stud partitions; for these partitions however, better transmission losses are obtained above the critical frequency when the studs are spaced at 406 mm on center.

- When resilient furrings are used in single steel stud partitions, the stud gauge has little influence on the STC rating obtained. There is however, a slight increase in transmission loss as the gauge is increased (lighter stud).

- Generally speaking, a partition with a deeper cavity will provide better TL at low frequencies and consequently a higher STC rating.

- The installation of resilient furrings on one side of a single wood stud partition containing a sound absorptive material increases its STC rating by a minimum of 10 points; for a partition constructed with staggered wood studs, installing resilient furrings on one side leads to an improvement of the STC rating of 3 to 4 points. Wood stud partitions built with resilient furrings on both sides instead of just one side provide superior sound transmission loss, notably for frequencies above 160 Hz when the stud spacing is 406 mm on center.

- The spacing of the resilient furrings has little or no effect on the performance of a partition when the studs are spaced at 610 mm on center. When the studs are spaced at 406 mm on center, installing resilient furrings at 610 mm rather than at 406 mm on center provides a 2 to 4 point increase in STC rating of the partition. The most effective arrangement for the studs and resilient furrings of a partition is to have them both spaced at 610 mm on center.

- The orientation (horizontal or vertical, installed facing up or down), the side of the partition on which they are installed, and the manufacturer of resilient furrings do not have a significant effect on its sound isolating performance expressed in terms of STC.

- Installing resilient furrings on a single steel stud partition constructed with heavy gauge studs offers equal or better transmission loss than an identical partition built using standard gauge studs (25 gauge) without resilient furrings.

- Installing resilient furrings between the wood studs and the gypsum boards composing a partition is much more effective than a fiberboard panel to mechanically decouple the gypsum board from the structure of the partition and hence to increase its sound transmission loss, especially above 250 Hz.

- Adding a sound absorptive material inside the cavity of a single stud partition (wood with resilient furrings or steel) or a staggered wood stud partition increases the STC rating by 5 to 9 points depending on the type of sound absorptive material used. For double stud partitions, an increase of 10 to 13 points was obtained depending on the amount of glass fiber insulation added to the cavity.

- Generally, at low frequencies, the increase in the transmission loss of a partition obtained by adding a sound absorptive material inside its cavity is equivalent regardless of the material used. Above 250 Hz, mineral fiber and blown cellulose give the best results; mineral fiber insulation provides slightly better transmission losses than glass fiber, especially around the critical frequency. Also, in the case of glass fiber, a greater transmission loss can be achieved by using denser batts.

- With the exception of sprayed cellulose, the best transmission losses were obtained when the entire cavity of the partitions were filled with a sound absorptive material. When the entire cavity is filled, caution must be taken not to use a material that is too dense or too thick otherwise a mechanical coupling could occur between the two sides of the partition which could result in a degradation of the sound isolating performance of the partition, as was observed in the case of a partition whose cavity was filled with sprayed-on cellulose.

- Inserting a panel in the middle of a double wood stud partition, making it a triple leaf partition, substantially increases the transmission loss above 250 Hz (frequencies for human speech) so long as the panel does not create a mechanical link between the two rows of studs. The use of a fiberboard panel seems to be superior to that of a gypsum board for this application. However, inserting a third panel, wether it be made of gypsum or fiberboard, reduces the transmission loss at low frequencies (stereo systems, home theater) as well as the

STC rating of the partition. Installing an additional gypsum board on the outside of a double stud partition seems preferable to installing it in the middle of the partition: it provided equivalent sound isolation at mid and high frequencies and noticeably better sound isolation at low frequency, which in turn increased the STC rating of the partition by 7 points.

- The use of gypsum board gussets to bridge and stiffen the two rows of steel studs in a double stud partition substantially deteriorates its transmission loss at mid and high frequencies.

- Double stud (wood or metal) partitions provide better sound isolation than single stud partitions because of the greater depth of the cavity inside the partition, but also because of the greater mechanical decoupling between the two sides of the partition achieved by the two separate rows of studs.

- Staggered wood stud partitions are a compromise between single and double stud partitions: the depth of the cavity of such partitions is between that of a single and a double stud partition, and the mechanical decoupling achieved from the staggered studs is not quite as good as that achieved with a double row of studs, but better than a single wood stud partition constructed with the gypsum boards mounted directly to the studs (i.e. no resilient furrings).

ISOLATION ACOUSTIQUE ASSURÉE PAR LES CLOISONS DE PLAQUES DE PLÂTRE

RÉSUMÉ

La SOCIÉTÉ CANADIENNE D'HYPOTHÈQUES ET DE LOGEMENT a retenu les services de MJM ACOUSTICAL CONSULTANTS INC. pour analyser les résultats de 350 essais de transmission sonore de cloisons en plaques de plâtre ayant diverses compositions. Les résultats de ces essais ont été publiés dans le rapport n° 761 produit par l'INSTITUT DE RECHERCHE EN CONSTRUCTION du CONSEIL NATIONAL DE RECHERCHES DU CANADA. Ce rapport contient les conclusions de notre analyse et fait ressortir les principaux facteurs qui influent sur le rendement des cloisons en plaques de plâtre, c'est-à-dire les plaques de plâtre elles-mêmes, les poteaux et leur agencement, les fourrures souples et les matériaux insonorisants insérés dans la cavité.

Nous sommes arrivés aux conclusions suivantes :

- La masse surfacique des plaques de plâtre du même type mais provenant de différents fabricants affiche de petites variations, sauf dans le cas des plaques de plâtre de type X de 13 mm où une variation maximale de 1,6 kg/m² (0,32 lb/pi²) a été notée. Une aussi petite variation de la masse surfacique se traduit par une variation d'environ 2 dB de la perte de transmission sonore des cloisons construites avec des plaques de plâtre équivalentes provenant de fabricants différents, sauf à la fréquence critique[1] des plaques de plâtre où l'on a observé une variation de 5 dB.

- En règle générale, l'indice de transmission du son (ITS) d'une cloison augmente proportionnellement à la masse surfacique des plaques de plâtre utilisées pour la construire. Toutefois, dans la fourchette de 1 000 Hz à 3 150 Hz environ, on obtient généralement de

[1] Fréquence critique : La fréquence la plus basse à laquelle la longueur des ondes de flexion dans un matériau est la même que celle des ondes sonores dans l'air; c'est à la fréquence critique qu'un matériau transmet le son le plus efficacement.

meilleures pertes de transmission en utilisant des plaques de plâtre plus minces, dont la fréquence critique est supérieure à celle des plaques plus épaisses. Le meilleur compromis consiste à utiliser une plaque de plâtre plus mince (meilleure perte de transmission à des fréquences supérieures) dont la masse surfacique est suffisamment grande pour éviter de réduire considérablement la perte de transmission à de faibles fréquences et, par conséquent, l'ITS. En se fondant sur les résultats de cette étude, il semble préférable de construire une cloison insonorisante en utilisant des plaques de plâtre de type X de 13 mm plutôt que des plaques de type X de 16 mm.

- Sauf dans le cas des cloisons à simple ossature construites sans fourrures souples, il y a une hausse de l'ITS d'environ cinq points chaque fois qu'on double les plaques de plâtre des deux parois de la cloison. À de basses fréquences, la perte de transmission augmente d'environ 5 dB pour chaque doublage des plaques de plâtre d'une paroi de la cloison. À mesure que la fréquence augmente, toutefois, l'augmentation devient moins évidente et peut être nulle dans certains cas à des fréquences élevées; cela pourrait être attribuable au couplage mécanique qui se produit entre les deux parois de la cloison, ou encore, à la résonance créée par la mince couche d'air entre les deux couches de plaques de plâtre constituant chaque paroi de la cloison (aux endroits où les joints des deux plaques de plâtre se chevauchent, par exemple).

- Dans le cas d'une cloison à simple ossature dont une paroi est composée d'une seule plaque de plâtre de 16 mm, et l'autre, de deux plaques de 16 mm, le fait de remplacer une des deux plaques de 16 mm de la paroi double par une plaque de 13 mm n'a pas changé de façon significative l'ITS, mais a permis d'améliorer légèrement l'indice d'affaiblissement acoustique de la cloison aux alentours de la fréquence critique des plaques de plâtre.

- L'espacement des poteaux n'a pratiquement aucun effet sur le pouvoir insonorisant des cloisons à simple ossature (en poteaux métalliques ou de bois, avec ou sans fourrures souples) dont la cavité ne contient aucun matériau insonorisant, ou d'une cloison à double ossature de poteaux en bois. Toutefois, lorsqu'on remplit la cavité d'une cloison à simple ossature (en poteaux métalliques ou de bois, avec ou sans fourrures souples) de fibre de

verre, on obtient un meilleur ITS lorsque les poteaux sont posés à entraxes de 610 mm plutôt qu'à entraxes de 406 mm. Il en est de même pour les cloisons à poteaux en quinconce. Dans ce dernier cas, toutefois, on obtient de meilleures pertes de transmission au-dessus de la fréquence critique lorsque les poteaux sont posés à entraxes de 406 mm.

- Lorsqu'on utilise des fourrures souples dans des cloisons à simple ossature en acier, l'épaisseur des poteaux a peu d'effet sur l'ITS qu'on obtient. Toutefois, il y a une légère hausse de la perte de transmission à mesure que l'épaisseur augmente (poteaux plus légers).

- En règle générale, une cloison ayant une cavité plus profonde aura un meilleur indice d'affaiblissement acoustique à de basses fréquences et, par conséquent, un ITS supérieur.

- L'installation de fourrures souples sur une paroi d'une cloison à simple ossature en bois contenant un matériau insonorisant augmente son ITS d'au moins 10 points; dans le cas d'une cloison à poteaux en quinconce, l'installation de fourrures souples sur une paroi permet d'améliorer l'ITS de trois à quatre points. Les cloisons à ossature de bois ayant des fourrures souples sur les deux parois plutôt que sur une seule offrent une meilleure perte de transmission sonore, notamment pour les fréquences supérieures à 160 Hz lorsque les poteaux sont posés à entraxes de 406 mm.

- L'espacement des fourrures souples n'a pas ou à peu près pas d'effet sur le rendement d'une cloison lorsque les poteaux sont posés à entraxes de 610 mm. Lorsque les poteaux sont posés à entraxes de 406 mm, l'installation de fourrures souples à entraxes de 610 mm plutôt qu'à entraxes de 406 mm permet d'accroître l'ITS de la cloison de deux à quatre points. On obtient le meilleur rendement des poteaux et fourrures souples d'une cloison en les posant tous deux à entraxes de 610 mm.

- L'orientation des fourrures souples (horizontale ou verticale, installées endroit dessus ou endroit dessous), la paroi de la cloison sur laquelle elles sont installées et le fabricant des fourrures souples n'ont aucun effet significatif sur le degré d'insonorisation de la cloison exprimé par l'ITS.

- L'installation de fourrures souples sur une cloison à simple ossature en acier épais offre une perte de transmission égale ou supérieure à celle qu'on obtient d'une cloison identique utilisant des poteaux d'épaisseur standard (25) sans fourrures souples.

- L'installation de fourrures souples entre les poteaux de bois et les plaques de plâtre constituant une cloison est beaucoup plus efficace que le recours à un panneau de fibre pour assurer le découplage mécanique de la plaque de plâtre de la structure de la cloison et, par conséquent, pour accroître sa perte de transmission sonore, surtout au-dessus de 250 Hz.

- L'ajout d'un matériau insonorisant à l'intérieur de la cavité d'une cloison à simple ossature (en bois avec fourrures souples ou en acier) ou d'une cloison à poteaux en quinconce en bois augmente l'ITS de cinq à neuf points, selon le type de matériau insonorisant utilisé. Dans le cas des cloisons à double ossature, on obtient une hausse de dix à treize points selon la quantité d'isolant en fibre de verre placé dans la cavité.

- Généralement, aux basses fréquences, l'augmentation de la perte de transmission d'une cloison qu'on obtient en ajoutant un matériau insonorisant à l'intérieur de sa cavité est équivalente, quel que soit le matériau utilisé. Au-delà de 250 Hz, la fibre minérale et l'isolant cellulosique projeté donnent les meilleurs résultats; la fibre minérale permet d'obtenir des pertes de transmission légèrement meilleures que la fibre de verre, notamment aux alentours de la fréquence critique. En plus, dans le cas de la fibre de verre, on peut obtenir une perte de transmission supérieure en utilisant des matelas plus denses.

- Sauf dans le cas de l'isolant cellulosique projeté, on a obtenu les meilleures pertes de transmission lorsque toute la cavité de la cloison était remplie d'un matériau insonorisant. Lorsque la totalité de la cavité est remplie, il faut prendre garde de ne pas utiliser un matériau trop dense ou trop épais, car cela créerait un couplage mécanique entre les deux parois de la cloison. Cela pourrait entraîner une diminution du rendement insonorisant, comme on l'a vu dans le cas d'une cloison dont la cavité est remplie d'isolant cellulosique projeté.

- L'insertion d'une plaque au milieu d'une cloison à double ossature en bois, ce qui en fait une cloison à trois feuilles, augmente considérablement la perte de transmission au-dessus de 250 Hz (fréquences de la parole), en autant que la plaque ne crée pas de lien mécanique entre les deux rangées de poteaux. L'utilisation d'un panneau de fibre semble donner de meilleurs résultats qu'une plaque de plâtre pour cette application. Toutefois, l'insertion d'une troisième plaque, qu'elle soit composée de plâtre ou de fibre, réduit la perte de transmission aux basses fréquences (chaînes stéréophoniques, cinéma maison) ainsi que l'ITS de la cloison. L'installation d'une plaque de plâtre supplémentaire à l'extérieur d'une cloison à double ossature semble préférable à l'installation d'une telle plaque au milieu de la cloison : cela a donné un degré d'insonorisation équivalent aux fréquences moyennes et élevées et une insonorisation considérablement meilleure aux basses fréquences, ce qui à son tour a fait grimper l'ITS de la cloison de sept points.

- L'utilisation de goussets en plaque de plâtre pour contreventer et renforcer les deux rangées de poteaux d'acier dans une cloison à double ossature diminue considérablement sa perte de transmission aux fréquences moyennes et élevées.

- Les cloisons à double ossature (en bois ou en métal) offrent une meilleure insonorisation que les cloisons à simple ossature en raison de la profondeur plus grande de la cavité à l'intérieur de la cloison, mais aussi en raison du meilleur découplage mécanique entre les deux parois de la cloison qu'on obtient en ayant deux rangées séparées de poteaux.

- Les cloisons à poteaux en quinconce en bois sont un compromis entre les cloisons à simple ossature et à double ossature : la profondeur de la cavité de telles cloisons se situe entre celles de la cloison à simple ossature et de la cloison à double ossature, et le découplage mécanique qu'on obtient au moyen des poteaux en quinconce n'est pas tout à fait aussi bon que celui que procure une double rangée de poteaux. Par contre, il est meilleur que le découplage mécanique que procure une cloison à simple ossature en bois construit au moyen de plaques de plâtre fixées directement aux poteaux (c.-à-d. sans fourrures souples).

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NOISE ISOLATION PROVIDED BY GYPSUM BOARD PARTITIONS

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NOISE ISOLATION PROVIDED BY GYPSUM BOARD PARTITIONS

INTRODUCTION

In October 1995, the Institute of Research in Construction of the National Research Council of Canada published a summary report (internal report IRC-IR-693) containing the results of 285 sound transmission loss tests performed on lightweight walls constructed with gypsum boards. The research project was supported by a consortium including Canada Mortgage and Housing Corporation (CMHC), Canadian Sheet Steel Building Institute (CSSBI), Cellulose Insulation Manufacturers Association of Canada (CIMAC), Forintek Canada (FORINTEK), Gypsum Manufacturers of Canada (GMC), the Institute for Research in Construction of the National Research Council Canada (IRC/NRCC), Owens Corning Fiberglas Canada Inc. (OCFCI), and Roxul Inc. (ROXUL).

The above mentioned summary report provided results expressed in terms of Sound Transmission Class (STC) only. In 1998, the Institute of Research in Construction published its internal report n° 761, which is an extension of its IRC-IR-693 summary report. In the IRC 761 report, one can find the complete results expressed in terms of 1/3rd octave sound transmission loss from 50 Hz to 6300 Hz of acoustical tests conducted on 350 gypsum wall compositions (the 285 compositions published in the summary report plus an additional 65) along with the physical properties of the materials and the methods used during the construction of the sample partitions. This database provided the basis for a broad general evaluation of sound transmission through gypsum board wall systems.

In July 2001, the CMHC commissioned MJM ACOUSTICAL CONSULTANTS INC. to analyse the data contained in IRC report n° 761, and to prepare the present report in which the main factors influencing the performance of gypsum board partitions are discussed. This report has been organized to reflect the respective influence, on the sound transmission loss of gypsum board partitions, of its four main components: the gypsum boards themselves, the studs and stud arrangements, the resilient furrings, and the sound absorptive materials inserted in the cavity.

1.0 GYPSUM PANELS

1.1 Gypsum boards by different manufacturers

Graphs 1 to 3 show a series of tests conducted on identical partitions where only the manufacturers of the gypsum boards differed. The surface mass of the gypsum boards varied only slightly from one manufacturer to another with the exception of the 13 mm type "X" boards whose surface mass varied by 1.6 kg/m^2 (0.32 lbs/ft^2), whereas the largest variation noted amongst boards of the same thickness did not exceed 0.6 kg/m^2 (0.12 lbs/ft^2) in all other cases.

When comparing the sound transmission loss plotted on **graphs 1 to 3**, one notes that:

- A greater surface mass of the gypsum boards results in an increased STC rating;
- The largest variation in STC rating between partitions built with gypsum boards of the same thickness and type but from different manufacturers was 2 points;
- The variations of the sound Transmission Loss (TL) measured on partitions built with gypsum boards of the same thickness and type but from different manufacturers were in the order of 2 dB, except near the critical frequency[1] of the gypsum boards where a difference of up to 5 dB could be observed.

1.2 Thickness and density of gypsum boards

The influence of the thickness and density of the gypsum boards on the sound Transmission Loss (TL) measured on various types of partitions (wood or steel studs, single or double rows of studs, etc.) is discussed in this section:

1 Critical frequency: The lowest frequency at which the length of the bending waves in a material is the same as that of the sound waves in the air; it is at the critical frequency that a material irradiates sound most effectively.

.1 **Single wood stud partitions**

a) **Gypsum boards directly attached to the studs**

In the case of single stud partitions with the gypsum boards directly attached to the studs, changing the thickness and the type of gypsum boards results in a variation of 1 STC point as seen on **graph 4**. Also worth noting on this graph is that the partitions built with 13 mm gypsum boards provide approximately the same TL despite different surface masses (10.0 kg/m^2 versus 8.3 kg/m^2), whereas the partition constructed with heavier 16 mm gypsum panels provides a noticeably inferior performance for almost all frequency bands comprised between 125 Hz and 3150 Hz: for some 1/3 octave bands near the critical frequency, the TL curve of the partition built with 16 mm drywall is 12 dB lower than that of the 13 mm type "X" drywall.

b) **Resilient furrings between the gypsum boards and the studs on one side of the partition**

When inserting resilient furrings on one side of the partition between the wood studs and the gypsum panel, the variations of TL between partitions built with 13 and 16 mm gypsum boards are less obvious, as seen on **graph 5** (the curves plotted roughly coincide). The partitions built with 13 mm gypsum boards of various densities have similar STC ratings (STC 42 to STC 43); however, using 16 mm instead of 13 mm drywall, results in an increase of 3 to 4 points of STC.

One notes on **graph 5** that, as the surface mass of the gypsum panel is increased, the transmission loss also increases for low and mid frequencies (below 800 Hz); however, above 800 Hz the opposite occurs. This can be explained by the fact that the critical frequency occurs earlier for 16 mm gypsum board compared to a 13 mm board (2500 Hz instead of 3150 Hz). The decrease in TL associated with the critical frequency causes large differences in the TL curves around 2000 Hz.

In the majority of cases the critical frequency (easily identified graphically by a pronounced dip in the transmission loss curve of the partition) seems to increase as the surface mass of the gypsum boards decreases, which contradicts the accepted theory (see equation below) stating that the critical frequency is proportional to the square root of the surface mass. However, in general it was noted that a decrease in the surface mass of the gypsum boards tested in this study resulted in a proportionately greater decrease in the bending stiffness; since the critical frequency is inversely proportional to the square root of the bending stiffness, this could explain the fact that the critical frequency increases as the surface mass of the panels decrease.

$$f_c = -\frac{c^2}{2\pi}\sqrt{\frac{\rho_s}{B}}$$

f_c : critical frequency, Hz
c : speed of sound in air, m/s
ρ_s : surface mass, kg/m^2
B : bending stiffness, N·m

.2 **Single steel stud partitions**

In the case of partitions built with a single row of standard steel studs (made of 25 gauge steel) the same trends were noted as those with single wood stud partitions with resilient furrings outlined in **article 1.2.1 b)** above. **Graphs 6 to 8** show the comparison of partitions with studs spaced at 406 mm on center and **graphs 9 to 15** show the comparison of partitions with studs spaced at 610 mm on center.

On **graphs 9 to 15** it can be seen that in most cases, changing the thickness or type of boards results in little or no change in TL for frequencies below 160 Hz; above this frequency however, the TL curves start to stray from one another.

The influence of the thickness of the gypsum boards on the TL seems to vary depending on the stud set used. For example, on **graph 10**, 3 partitions are compared with the same stud set; among these partitions the one composed of 13 mm type "X" and the one composed of 16 mm type "X" gypsum boards having similar surface masses provide comparable TL up to 1000 Hz. On **graph 13**, where TL curves of partitions constructed with different stud sets are plotted, a difference of 5 dB occurs between 250 Hz and 1250 Hz between the TL curve of the partition composed of 13 mm type "X" and that of the partition composed of 16 mm type "X" gypsum boards of comparable surface mass. Further testing will be necessary in order to ascertain the influence of the stud set on the TL performance of a steel stud partition from 160 Hz to 1000 Hz. The influence of stud sets is further discussed in **article 2.1** of this report.

.3 Double stud partitions

The TL curves plotted on **graphs 16 to 21** for partitions constructed with two rows of wood or steel studs, and for partitions constructed with staggered wood studs indicate that generally, higher TL values and STC ratings are obtained as the surface mass of the gypsum boards used to construct a partition increases. However, due to the critical frequency of the gypsum boards, partitions built with thinner gypsum panels provide significantly higher sound transmission losses around 2000 Hz.

1.3 <u>Number of gypsum boards composing each leaf of a partition</u>

This section discusses the influence of the number of gypsum boards used to construct a partition on its sound isolation properties.

.1 Single wood stud partitions

a) Gypsum boards directly attached to the studs

Adding a gypsum board to a single wood stud partition constructed with gypsum boards attached directly onto the studs and mineral fiber batt insulation inside the cavity **(graph 22)** provides an approximate 2 dB increase for almost all frequencies, and a 2 point increase in the STC rating.

When the cavity is filled with blown cellulose, (**graph 23**) adding a gypsum board to one side of the partition increases the STC rating by 5 points, but adding another board on the opposite side of the partition increases the STC rating by only 1 point, and provides little or no benefit in the transmission loss between 160 Hz and 2500 Hz.

b) Resilient furrings between the gypsum boards and the studs on one side of the partition

Graphs 24 to 30 show that for single wood stud partitions constructed with resilient furrings between the wood studs and the gypsum panels on one side of the partition, the STC rating is increased by about 5 or 6 points each time the gypsum boards are doubled on one side, regardless of the type or thickness of the boards and regardless of the sound absorptive material used in the cavity of the partition. The transmission loss also increases by about 5 or 6 dB between 80 Hz and 5000 Hz with the exception of the frequencies contained between 500 Hz and 2000 Hz for which the increase in transmission loss is only about 2 or 3 dB.

.2 Single steel stud partitions

The trends outlined in article **1.3.1 b)** above for single wood stud partitions constructed with resilient furrings, can also be observed on **graphs 31 to 33B** for partitions constructed with a single row of 25 Ga steel studs spaced at 406 mm on center. When the steel studs are spaced at 610 mm on center (**graphs 34 to 42**) doubling the gypsum on one side results in an increase of 5 STC points; doubling the gypsum on the other side provides an additional increase in STC rating of 3 to 4 points and in most cases, virtually no increase in transmission loss above 250 Hz.

.3 Double wood stud partitions

For double wood stud partitions, **graphs 43 to 45C** show that on average, there is a 5 point increase in the STC rating each time gypsum boards are doubled. One notes that up to about 500 Hz the transmission loss increases an even 5 dB on average for

each doubling of the gypsum boards. In certain cases, above 500 Hz, the increase in transmission loss in relation to the doubling of the gypsum boards is less noticeable up to 2000 Hz. This trend seems to be more apparent when the studs are spaced at 610 mm on center, and is presumed to be due to the presence of a thin layer of air between the gypsum boards, which results in a mass-air-mass resonance that deteriorates the TL at higher frequencies.

.4 Double steel stud partitions

Double steel stud partitions seem to behave in a similar fashion to double wood stud partitions. As shown on **graph 46,** the STC rating is increased by 10 points when the gypsum boards are doubled on both sides of a partition, and the increase in transmission loss is somehow less above at 500 Hz presumably due to the mass-air-mass resonance mentioned in **paragraph 1.3.3** above. As illustrated on **graphs 47 and 48**, doubling the gypsum boards has no effect on the TL values between 630 Hz and 1600 Hz. This may be due to the fact that gypsum gussets were used to bridge the two stud rows and stiffen the partition, creating a direct mechanical coupling between the two sides of the partition. On **graph 49** this phenomenon occurs only at 800 Hz.

.5 Staggered wood stud partitions

Graphs 50 to 53 illustrate that doubling the gypsum boards of staggered wood stud partitions provides the same increase in performance as that described in **paragraph 1.3.3** for double wood stud partitions.

.6 Substitution of a 16 mm gypsum board by a 13 mm gypsum board in a partition composed of three boards

Substituting one of the two 16 mm gypsum boards on one side of a partition composed of a total of three gypsum boards, by a 13 mm board has no notable effect on the transmission loss of the partition as can be seen on **graphs 54 and 55,** except around the critical frequency where a small increase in transmission loss is noted.

2.0 STUDS

2.1 Stud sets

Graphs 56 to 65 compare the transmission loss provided by partitions of identical composition whose stud structures have been reconstructed. In most cases the differences are minimal and appear mostly above 500 Hz. However, there are some exceptions as in the case of **graph 58** where a difference of 4 STC points is observed, and on **graph 64** where a difference in transmission loss of the order of 4 dB can be seen at 160 Hz as well as above 500 Hz.

2.2 Spacing of studs

.1 Single stud partitions

With the absence of sound absorptive material in the cavity of a single stud partition (steel studs or wood studs with resilient furrings) the spacing of the studs (406 mm or 610 mm) has no influence on the STC rating and a marginal effect on the TL as shown on **graphs 65 to 67**. Varying the spacing of the studs from 406 mm to 610 mm in partitions with glass fiber batt insulation in the cavity **(Graphs 68 to 71)** increases the STC rating by 1 to 7 points. This trend is most obvious with partitions constructed with wood studs and resilient furrings, especially when the resilient furrings are spaced at 406 mm on centers.

.2 Double stud partitions

Changing the spacing of the studs of a double stud partition results in negligible differences in transmission loss of the partition as shown on **graphs 72 and 73**.

.3 Staggered wood studs

Staggered wood stud partitions provide better transmission loss at low frequencies when the studs are spaced at 610 mm on center comparatively to 406 mm. At the critical frequency of the gypsum boards and above, the opposite occurs: a greater TL is obtained with a stud spacing of 406 mm on center **(graphs 74 and 75)**.

2.3 Steel stud gauges

In cases of partitions constructed using heavy gauge steel studs (16, 18 and 20 Ga) with resilient furring channels inserted between the studs and the gypsum boards on one side of the partition, varying the gauge of the studs does not cause large variations in the TL as shown on **graphs 76 and 77**. Nonetheless, the transmission loss is slightly higher with the use of lighter gauges.

2.4 Stud depths

The transmission loss curves of two single stud partitions of the same composition except for the depth of the metal studs are compared on **graphs 78 and 79**. It can be seen that the transmission loss provided by the partition increases proportionately with the depth of the studs used, and hence with the depth of the cavity. A deeper cavity results in a lower mass-air-mass resonance, which shifts the transmission loss curve lower in the frequency spectrum, which in turns results in higher TL and STC ratings.

3.0 RESILIENT FURRINGS

3.1 Single wood stud partitions

It is shown on **graphs 80 to 83** that adding resilient furrings to a single wood stud partition whose cavity is filled with a sound absorptive material increases the STC rating by a minimum of 10 points. There is a substantial increase in TL starting at 125 Hz that can reach nearly 20 dB for certain frequencies. The effects of adding resilient furrings on both sides of the partition instead of only on one side is shown on **graphs 84 to 87.** With a stud spacing of 406 mm on center, one notes a significant increase in the TL values starting at 160 Hz, and a 1 to 3 point increase of the STC rating; with a stud spacing of 610 mm, installing resilient furrings on both sides of a partition causes no increase in STC and the benefit in terms of TL starts so show only for frequencies higher than 1000 Hz.

3.2 Staggered wood studs

Installing resilient furrings on one side of a partition built with staggered wood studs, provides an increase of 3 to 4 STC points; an additional 3 to 4 point increase is obtained when installing resilient furrings on both sides compared to only one side (**graphs 88 to 90**).

In relation to single wood stud partitions, the increase in transmission loss obtained with the installation of resilient furrings on one side is not as pronounced, mainly because of the staggered studs already provide a substantial decoupling of the gypsum panels.

3.3 Resilient furring spacing

The spacing of the resilient furrings has a minimal influence on the transmission loss provided by partitions built with studs spaced at 610 mm on center (**graphs 91 to 96**). However, for partitions built with studs spaced at 406 mm, varying the resilient channel spacing from 406 mm to 610 mm caused an increase of 2 to 4 STC points. On **graph 97** a comparison of four combinations between stud spacing and resilient furring spacing is shown; the best transmission loss was obtained when both the studs and the resilient furrings were spaced at 610 mm on center.

3.4 Resilient furrings in imbalanced gypsum partitions

For a partition constructed with two gypsum boards on one side and one gypsum board on the other, installing the resilient furring on one side or on the other of the partition has no significant effect on its sound isolation performance (**graphs 98 and 99**).

3.5 Resilient furring orientation in relation to the studs

Installing resilient furrings horizontally or vertically has a negligible influence on the transmission loss of partitions as shown on **graph 100**. Similarly, **graph 101** shows that installing the resilient furrings facing down, instead of facing up as recommended by the manufacturer, does not have a significant effect on the transmission loss provided by the partition.

3.6 Comparison of two types of resilient furrings

The **graphs 102 and 103** compare the transmission loss provided by two partitions of identical composition built with resilient furring channels fabricated by 2 different manufacturers. A small difference (of the order of 2 or 3 dB at most) is noticed between 125 Hz and 200 Hz and between 400 Hz and 800 Hz. In both cases, type "G.P." resilient furrings seemed slightly more effective.

3.7 Resilient furrings in steel stud partitions

Graph 104 shows a comparison of the transmission loss provided by two single steel stud partitions where one was built using 25 gauge studs and the other using 16 gauge studs with resilient furrings (26 gauge) on one side. The sound isolation achieved by both partitions is comparable but in general slightly superior for the partition with heavy gauge studs and resilient furrings. This increase could be due to the slight difference in the cavity depth caused by the thickness of the resilient channels.

3.8 Comparison between the use of resilient furrings and a fiberboard panel

The superiority of resilient furring channels over wood fiber boards to create an effective mechanical decoupling between the gypsum boards and the wood studs of a partition is clearly demonstrated on **graphs 105 to 107**. Above 250 Hz, the superior decoupling provided by resilient furrings results in gains in transmission loss of almost 20 dB over the partition built with fiberboard panels.

4.0 SOUND ABSORPTIVE MATERIAL

4.1 Single steel stud partitions

For partitions built with 25 Ga steel studs, changing the type of sound absorptive material in the cavity can result in a variation of 3 to 4 points in the STC rating (the partitions built with glass fiber and mineral fiber batt insulation providing the highest rating). As can be observed on **graphs 108 and 109**, the differences in TL are more noticeable starting from 250 Hz, where mineral fiber and blown cellulose give the best results. The lowest transmission losses were obtained with the partition cavity being filled with sprayed cellulose. **Graph 108** also shows that the addition of sound absorptive material in the cavity of a partition built with 25 Ga studs substantially increases its transmission loss between 100 Hz and 5000 Hz. On **Graph 110** one can observe that mineral fiber and glass fiber provide similar results; mineral fiber being slightly superior at mid frequencies (between 400 Hz and 1600 Hz).

4.2 Single wood stud partitions

Graph 111 shows that the use of different sound absorptive materials in the cavity of a single wood stud partition with resilient furrings can make the STC rating vary by 3 to 4 points. The best STC rating is obtained with the use of 40 mm thick sprayed cellulose, but above 250 Hz the best sound transmission loss is obtained when the entire cavity is filled with blown cellulose. **Graph 111** also illustrates the benefit of inserting a sound absorptive material in the cavity of a single wood stud partition with resilient furrings on one side (an improvement of up to 8 STC points and a near 20 dB increase at certain frequencies).

4.3 Staggered wood stud partitions

For partitions built with staggered wood studs **(graphs 112 and 113),** glass fiber batt insulation provides the best STC rating. Above 250 Hz however, the partition with blown cellulose provides the highest TL and the partition with woven glass fiber batt insulation provides the lowest.

The same trends hold true when resilient furrings are added between the studs and one side of the gypsum panels as can be seen on **graph 114**; one also notes on this graph that the blown cellulose provides more damping than glass fiber or sprayed cellulose around the gypsum's critical frequency, which results in a superior transmission loss around that frequency.

4.4 Double stud partitions

On **graph 115**, the transmission loss curves of partitions constructed with sound absorptive materials of different types and thickness are compared: the highest STC rating is achieved by the partition with the cavities of both stud rows filled with glass fiber batts. On **graph 116**, glass fiber batts of different thickness are compared with each other and with a 90 mm mineral fiber batt insulation; the highest STC rating was obtained by the partition constructed using glass fiber insulation to fill the cavity between the studs of each row. Under 250 Hz, one notices a very small difference between the three sound absorptive materials compared on **graphs 115 and 116**. Above 250 Hz, blown cellulose and mineral fiber give the highest

transmission loss results. Inserting batt insulation between the studs of both rows of a double stud partition, or using blown-in cellulose on one side, improves the sound transmission loss of the partition around the critical frequency of the gypsum boards.

4.5 Sound reduction as a function of the quantity and density of absorptive materials

On **graph 117,** the transmission loss provided by a double wood stud partition when its cavity is filled with glass fiber batt insulation of various thickness and densities are compared. The importance of inserting a sound absorptive material in the cavity of a sound isolating partition is also clearly illustrated on this graph. The STC rating is increased by 10 to 13 points and the TL, at certain frequencies, by 15 to 30 dB when one or two batts of glass fiber insulation are added in the cavity. Another conclusion which can be reached from comparing the curves on this graph, is that the more sound absorptive material contained in the cavity, the greater the transmission loss of the partition will be. When a cavity is filled with two glass fiber batts, the transmission loss is of the same order up to 315 Hz; after this frequency the partition with thicker or denser batt insulation provides the higher sound transmission loss.

Filling the cavity of a double wood stud partition with batt insulation installed in between the studs instead of filling only half of the cavity, increases the STC rating by 5 points **(graph 118)**. As noted above, completely filling the cavity instead of partially filling it with batt insulation causes a substantial increase in transmission loss around the critical frequency: the TL is increased by over 10 dB.

The transmission loss of a single steel stud partition whose cavity is filled with mineral fiber of differing thickness and densities is shown on **graph 119**. The greatest STC rating is obtained using the least dense mineral fiber. Above 500 Hz, the thicker batt insulation gives a better transmission loss and above the critical frequency, the denser batt insulation gives better results. As shown on **graphs 120 and 121**, the use of blown or sprayed cellulose gives approximately the same results when comparing STC ratings. However, blown cellulose is slightly better between 400 Hz and 1600 Hz. Spraying the entire cavity or spraying it only partially gives approximately the same transmission loss. However, a slight degradation of

the transmission loss is noticeable around 250 Hz when the sprayed cellulose fills the entire cavity: a mechanical coupling of the two sides of the partition by the sprayed cellulose could be responsible for this degradation.

5.0 MISCELLANEOUS

5.1 Adding a third panel in the middle of a double stud partition

The addition of a third panel in between two rows of the wood studs of a partition without creating a mechanical contact between the two rows of studs substantially increases the transmission loss provided by a partition starting at 250 Hz. A fiberboard seems to provide a better sound reduction than a gypsum board in this respect, notably at the critical frequency as shown on **graph 122**. Below 250 Hz, the presence of a third panel degrades the transmission loss of the partition by about 4 dB at 125 Hz and 160 Hz; the frequencies which govern the STC rating of the partition. Consequently, the STC rating is reduced by about 4 points when a third panel is added in between the two rows of studs. **Graph 123** further illustrates the degradation caused by adding a third panel in a double stud partition: note that the partitions illustrated on this graph have the exact same materials in their composition, except that in one case the third gypsum board is installed between the rows of studs and in the other case it is installed on one side of the partition. One can clearly see the decline in transmission loss at low frequencies resulting from installing a gypsum board in the center of the partition.

5.2 Installing gussets in a double stud partition

As shown on **graphs 124 and 125**, installing gypsum gussets between the two rows of steel studs to stiffen a partition significantly reduces its transmission loss at mid and high frequencies; this effect is more pronounced between 500 Hz and 1600 Hz for partitions constructed with two layers of drywall on each side. Adding gussets, however, has essentially no effect on the STC rating (a difference of only one point was noted).

5.3 Comparison between partitions built with one or two rows of studs and with staggered studs

.1 Wood Studs

On **graphs 126 to 129** the TL provided by partitions composed of one and two rows of studs and those composed of staggered studs are compared. One can see that a double wood stud partition provides a much higher degree of sound isolation than a single stud partition; the increase in sound insulation provided by an additional row of studs is in the order of 20 points of STC when compared to the sound insulation provided by a single stud partition with no resilient furrings and in the order of 10 points when resilient channels are added. When excluding resilient channels, the double stud partition provides the highest sound isolating performance and the single stud partition provides the lowest, the performance of staggered stud partitions lying somewhere in between.

Graphs 127 and 129 show that in terms of STC rating, a staggered stud partition gives the same result as a single stud partition with resilient channels. However, above 250 Hz, the transmission loss provided by staggered studs is inferior to that provided by single wood studs with resilient channels. This is due to a greater mechanical decoupling between the two sides of the partition provided by the resilient channels. As shown on **graphs 128 and 129** once resilient channels are added to a staggered stud partition, its transmission loss exceeds that of the single stud partition with resilient channels.

Generally speaking **(graphs 126, 128 and 129)**, in the absence of mechanical coupling, for partitions of similar composition, a deeper cavity inside the partition provides greater sound transmission loss.

.2 Steel Studs

On **graphs 130 and 132** the transmission loss provided by two single steel stud partitions (65 and 90 mm stud depths) and a double steel stud partition are compared. As noted earlier, with a deeper cavity inside the partition, better TL are achieved,

especially at low frequencies. Between 250 Hz and 1000 Hz, the TL curve of the double stud partition with gussets meets with that of the single stud partition (notably the 90 mm stud depth): this is most probably due to the mechanical coupling created by the gypsum gussets installed in between the two rows of studs in the double stud partition.

Graphs 133 and 134 show the comparison between the transmission loss provided by a single stud partition and a double stud partitions constructed with and without gypsum gussets in between the stud rows. One notices that the transmission loss of a double steel stud partition is substantially greater than a similar partition constructed with a single row of studs; the STC rating is superior by 10 points, and the increase in TL reaches more than 20 dB in some bands at high frequency.

CONCLUSIONS

- From one manufacturer to the next, there are small variations in terms of the surface mass for the same type of gypsum boards with the exception of 13 mm type "X" boards where a maximal variation of 1.6 kg/m^2 (0.32 lbs/ft^2) was noted. Such a small variation in surface mass translates in a variation of approximately 2 dB in the sound transmission loss of partitions constructed with equivalent gypsum boards made by different manufacturers, except around the critical frequency of the gypsum panels where a 5 dB variation can be observed.

- Generally speaking, the STC rating of a partition increases proportionately to the surface mass of the gypsum boards used in its construction. However, around the 1000 Hz to 3150 Hz range, better transmission losses are generally obtained using thinner gypsum boards for which the critical frequency is higher than that of thicker boards. The best compromise is to use a thinner gypsum board (better transmission loss at higher frequencies) whose surface mass is sufficiently heavy to avoid substantially reducing the transmission loss at low frequencies and hence the STC rating. Based on the results of this study it seems preferable to build a sound isolating partition using 13 mm type "X" gypsum boards rather than 16 mm type "X" boards.

- With the exception of partitions built with single wood studs without resilient furrings, there is an approximate 5 point STC rating increase each time the gypsum boards are doubled on either side of the partition. At low frequencies, the transmission loss is increased by about 5 dB for every doubling of the gypsum boards on one side of the partition. As the frequency rises however the increase becomes less obvious and can be nil in certain cases at high frequencies; this could be due to a mechanical coupling occurring between the two sides of the partition, or it could also be due to a mass-air-mass resonance created by a thin layer of air between the two layers of gypsum boards composing each side of the partition, (where the joints of the two sheets of drywall overlap for example).

- For a single stud partition constructed with one 16 mm gypsum board on one side and two 16 mm boards on the other side, replacing one 16 mm gypsum board by a 13 mm gypsum board on the side of the partition where the gypsum is doubled did not produce significant changes in the STC rating, but provided a slight improvement in the TL of the partition around the critical frequency of the gypsum boards.

- The spacing of the studs has practically no effect on the acoustical performance of single stud partitions (metal or wood, with or without resilient furrings) whose cavity contains no sound absorptive material, or of a double wood stud partition. However, when the cavity of a single stud partition (metal or wood, with or without resilient furrings) is filled with glass fiber, a higher STC rating is obtained when the studs are spaced at 610 mm on center rather than at 406 mm on center. The same is true for staggered wood stud partitions; for these partitions however, better transmission losses are obtained above the critical frequency when the studs are spaced at 406 mm on center.

- When resilient furrings are used in single steel stud partitions, the stud gauge has little influence on the STC rating obtained. There is however, a slight increase in transmission loss as the gauge is increased (lighter stud).

- Generally speaking, a partition with a deeper cavity will provide better TL at low frequencies and consequently a higher STC rating.

- The installation of resilient furrings on one side of a single wood stud partition containing a sound absorptive material increases its STC rating by a minimum of 10 points; for a partition constructed with staggered wood studs, installing resilient furrings on one side leads to an improvement of the STC rating of 3 to 4 points. Wood stud partitions built with resilient furrings on both sides instead of just one side provide superior sound transmission loss, notably for frequencies above 160 Hz when the stud spacing is 406 mm on center.

- The spacing of the resilient furrings has little or no effect on the performance of a partition when the studs are spaced at 610 mm on center. When the studs are spaced at 406 mm on center, installing resilient furrings at 610 mm rather than at 406 mm on center provides a 2 to 4 point increase in STC rating of the partition. The most effective arrangement for the studs and resilient furrings of a partition is to have them both spaced at 610 mm on center.

- The orientation (horizontal or vertical, installed facing up or down), the side of the partition on which they are installed, and the manufacturer of resilient furrings do not have a significant effect on its sound isolating performance expressed in terms of STC.

- Installing resilient furrings on a single steel stud partition constructed with heavy gauge studs offers equal or better transmission loss than an identical partition built using standard gauge studs (25 gauge) without resilient furrings.

- Installing resilient furrings between the wood studs and the gypsum boards composing a partition is much more effective than a fiberboard panel to mechanically decouple the gypsum board from the structure of the partition and hence to increase its sound transmission loss, especially above 250 Hz.

- Adding a sound absorptive material inside the cavity of a single stud partition (wood with resilient furrings or steel) or a staggered wood stud partition increases the STC rating by 5 to 9 points depending on the type of sound absorptive material used. For double stud partitions, an increase of 10 to 13 points was obtained depending on the amount of glass fiber insulation added to the cavity.

- Generally, at low frequencies, the increase in the transmission loss of a partition obtained by adding a sound absorptive material inside its cavity is equivalent regardless of the material used. Above 250 Hz, mineral fiber and blown cellulose give the best results; mineral fiber insulation provides slightly better transmission losses than glass fiber, especially around the critical frequency. Also, in the case of glass fiber, a greater transmission loss can be achieved by using denser batts.

- With the exception of sprayed cellulose, the best transmission losses were obtained when the entire cavity of the partitions were filled with a sound absorptive material. When the entire cavity is filled, caution must be taken not to use a material that is too dense or too thick otherwise a mechanical coupling could occur between the two sides of the partition which could result in a degradation of the sound isolating performance of the partition, as was observed in the case of a partition whose cavity was filled with sprayed-on cellulose.

- Inserting a panel in the middle of a double wood stud partition, making it a triple leaf partition, substantially increases the transmission loss above 250 Hz (frequencies for human speech) so long as the panel does not create a mechanical link between the two rows of studs. The use of a fiberboard panel seems to be superior to that of a gypsum board for this application. However, inserting a third panel, wether it be made of gypsum or fiberboard, reduces the transmission loss at low frequencies (stereo systems, home theater) as well as the STC rating of the partition. Installing an additional gypsum board on the outside of a double stud partition seems preferable to installing it in the middle of the partition: it provided equivalent sound isolation at mid and high frequencies and noticeably better sound isolation at low frequency, which in turn increased the STC rating of the partition by 7 points.

- The use of gypsum board gussets to bridge and stiffen the two rows of steel studs in a double stud partition substantially deteriorates its transmission loss at mid and high frequencies.

- Double stud (wood or metal) partitions provide better sound isolation than single stud partitions because of the greater depth of the cavity inside the partition, but also because of the greater mechanical decoupling between the two sides of the partition achieved by the two separate rows of studs.

- Staggered wood stud partitions are a compromise between single and double stud partitions: the depth of the cavity of such partitions is between that of a single and a double stud partition, and the mechanical decoupling achieved from the staggered studs is not quite as good as that achieved with a double row of studs, but better than a single wood stud partition constructed with the gypsum boards mounted directly to the studs (i.e. no resilient furrings).

Respectfully submitted January 11, 2002

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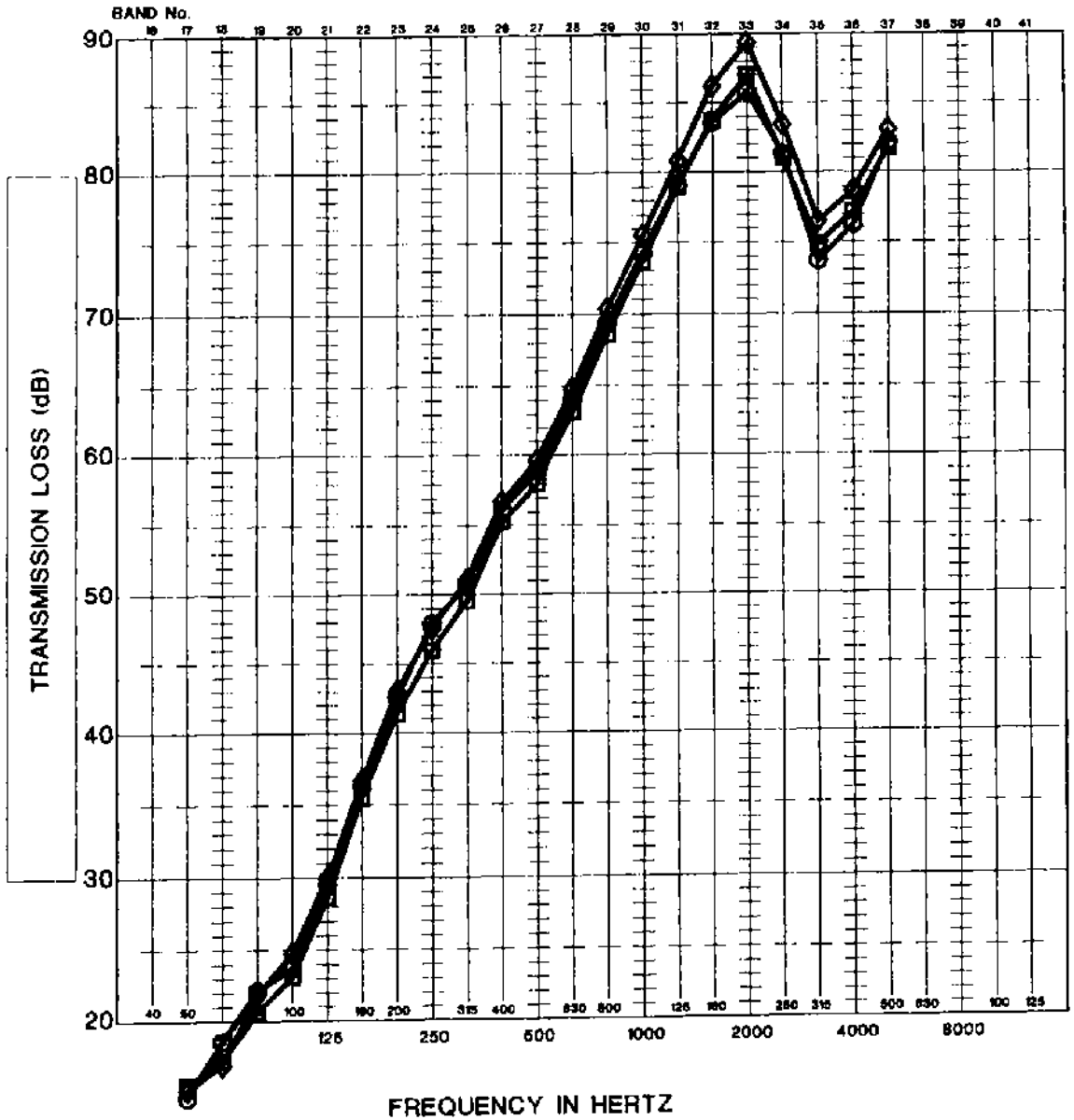
GRAPHS

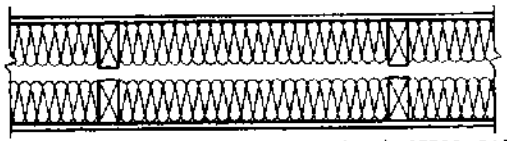
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

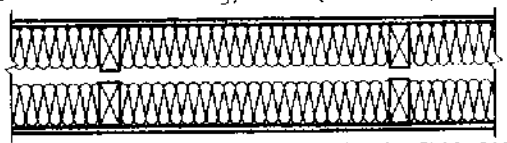
COMPARISON OF 13mm A, B AND C GYPSUM BOARDS

C BOARDS 8.05 kg/m² (STC 54)



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-294)

B BOARDS : 8.26 kg/m² (STC 55)



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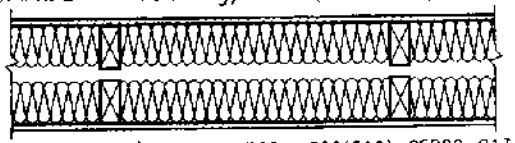
(TL-93-284)

A BOARDS : 7.66 kg/m² (STC 53)



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-291)

PROJECT DESCRIPTION

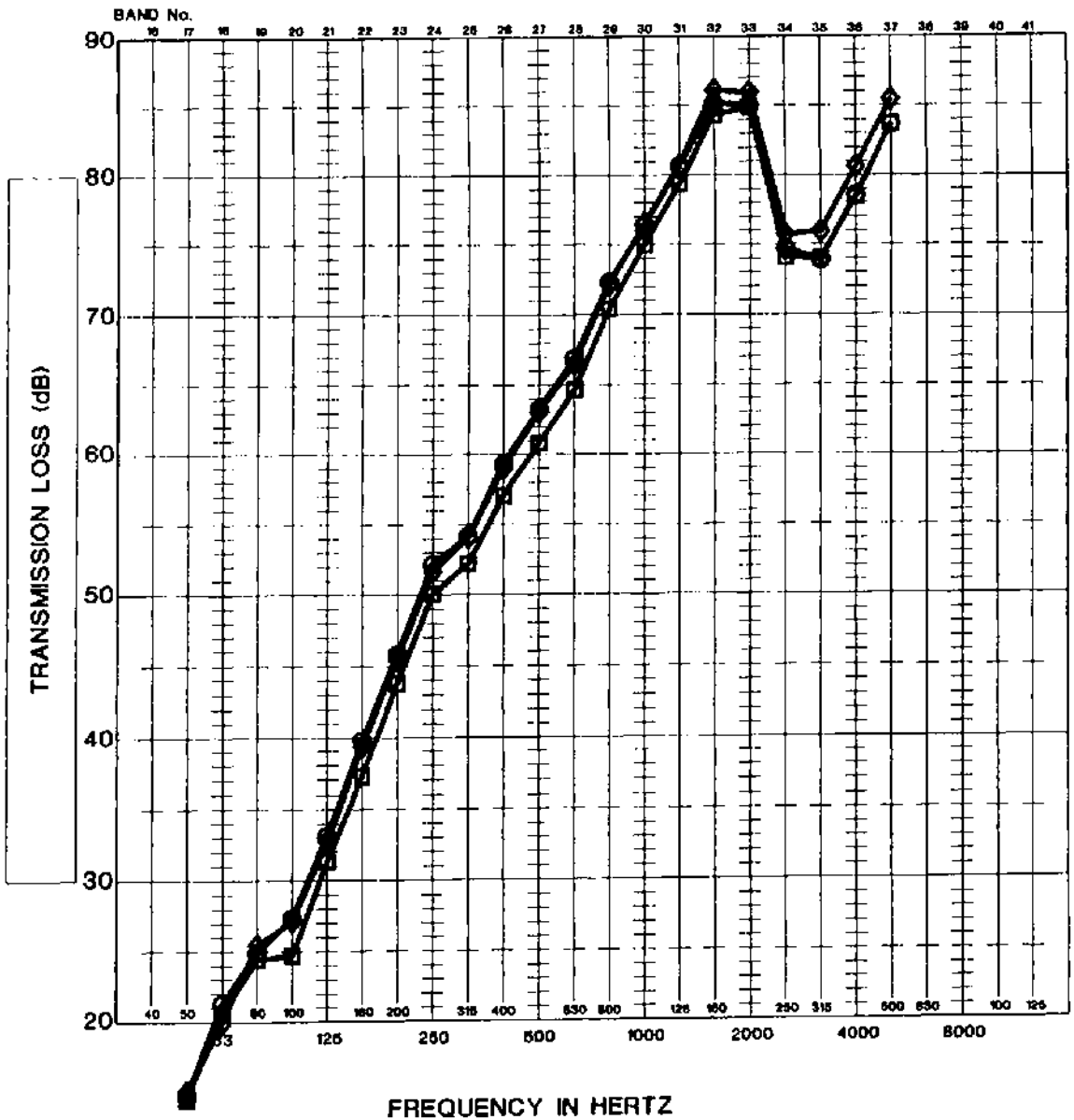
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF GYPSUM BOARDS FROM DIFFERENT MANUFACTURERS

GRAPH NUMBER 1	**FILE NAME:** 177GRA001
PROJECT NUMBER 177.011	**DATE** 2001 12

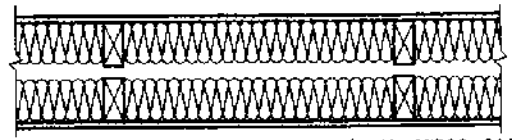
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

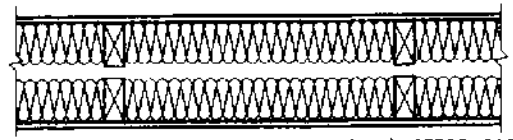
COMPARISON OF 13mm AX, BX, AND CX GYPSUM BOARDS
DOUBLE WOOD STUD WALLS

BX BOARDS 9 81 kg/m² (STC 57)



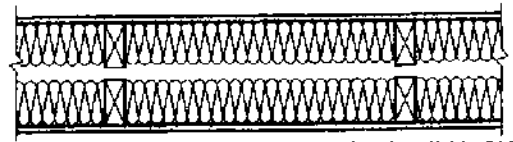
G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-290)

AX BOARDS . 10.27 kg/m² (STC 57)



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-288)

CX BOARDS . 8 64 kg/m² (STC 55)



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-289)

PROJECT DESCRIPTION

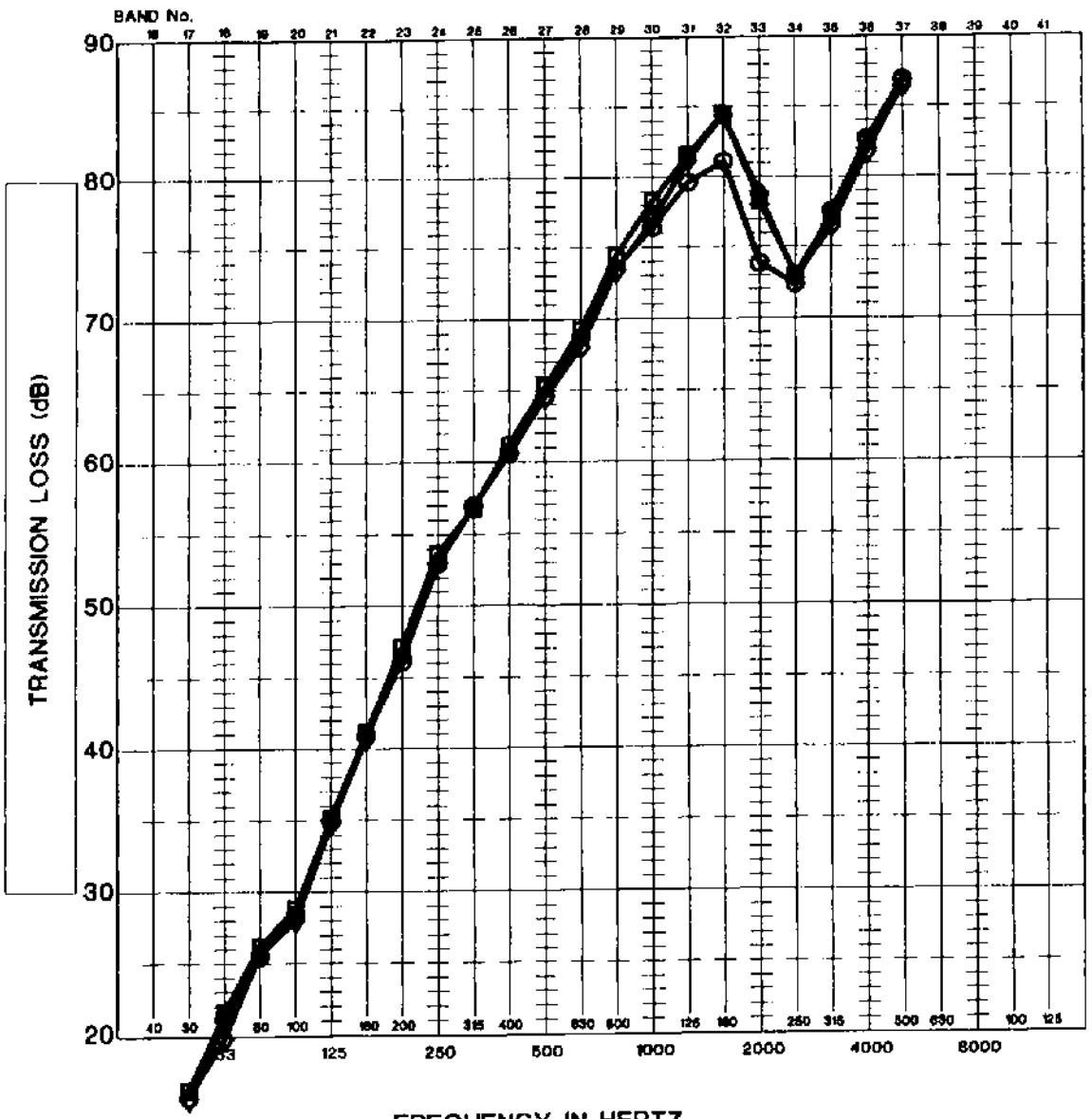
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF GYPSUM BOARDS FROM DIFFERENT MANUFACTURERS

GRAPH NUMBER 2	**FILE NAME:** 177GRA002
PROJECT NUMBER 177.011	**DATE** 2001 12

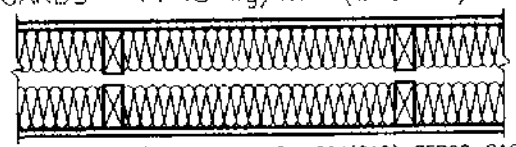
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

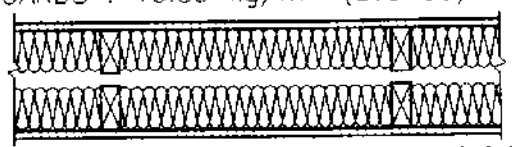
COMPARISON OF 16mm AX, BX AND CX GYPSUM BOARDS

AX BOARDS 11.45 kg/m² (STC 59)



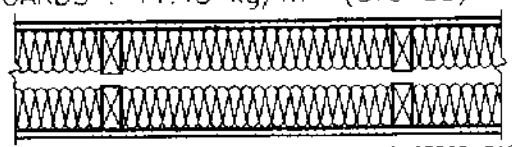
G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G16
(TL-93-292)

BX BOARDS : 10.89 kg/m² (STC 59)



G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G16
(TL-92-293)

CX BOARDS . 11.48 kg/m² (STC 59)



G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G16
(TL-93-281)

PROJECT DESCRIPTION

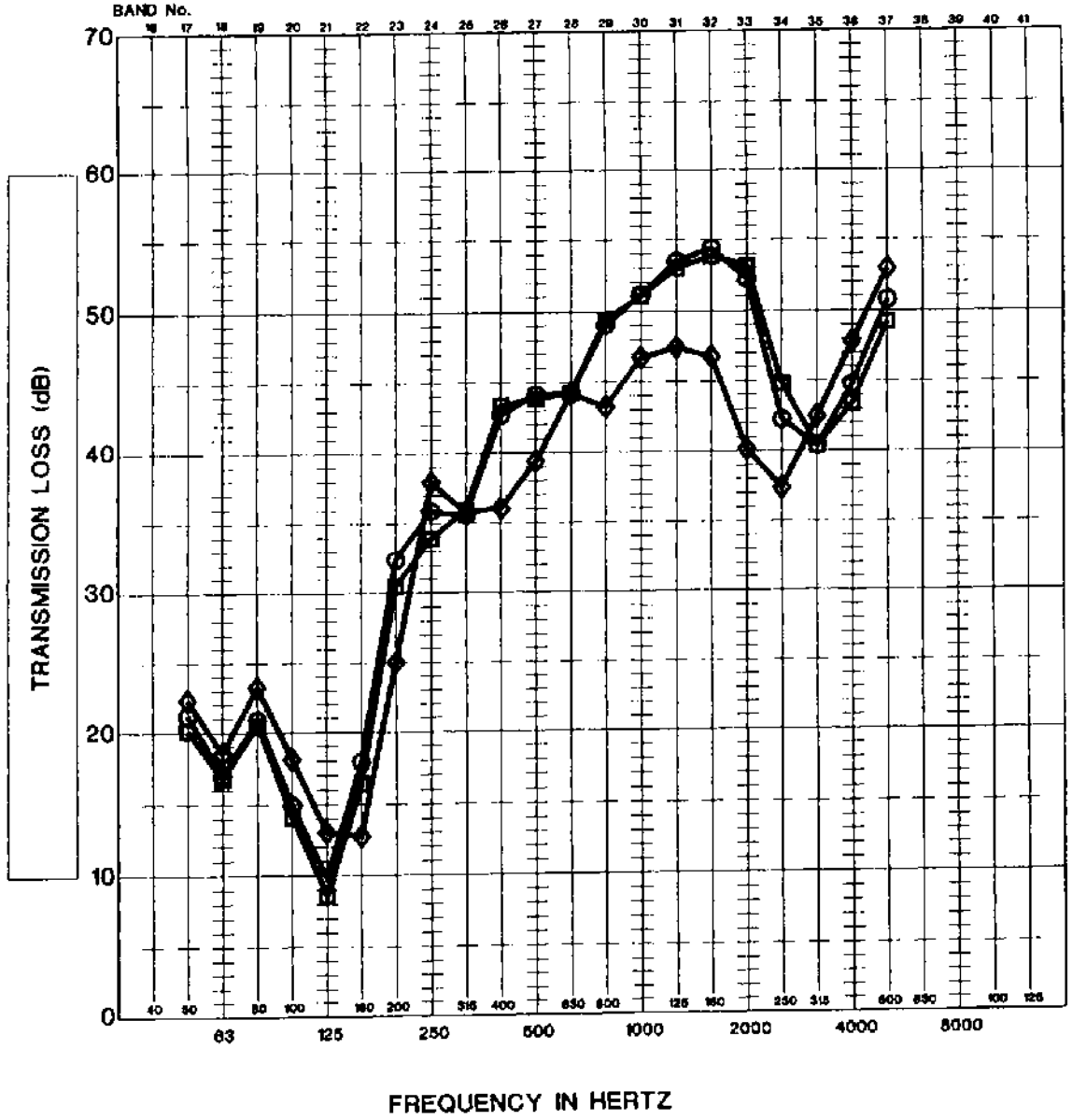
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF GYPSUM BOARDS FROM DIFFERENT MANUFACTURERS

GRAPH NUMBER 3	FILE NAME: 177GRA003
PROJECT NUMBER 177.011	DATE 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



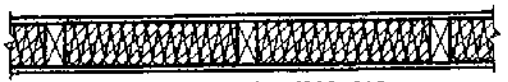
LEGEND

SINGLE ROW OF WOOD STUDS @ 406 mm
MINERAL FIBER INSULATION (M1)

G13 TYPE 'X' 10 01 kg/m² (STC 34)

G13_WS90(406)_MFB90_G13
(TL-93-180)

G13 : 8.28 kg/m² (STC 33)



G13_WS90(406)_MFB90_G13
(TL-93-166)

G16 TYPE 'X' : 11 00 kg/m² (STC 34)

G16_WS90(406)_MFB90_G16
(TL-93-157)

PROJECT DESCRIPTION

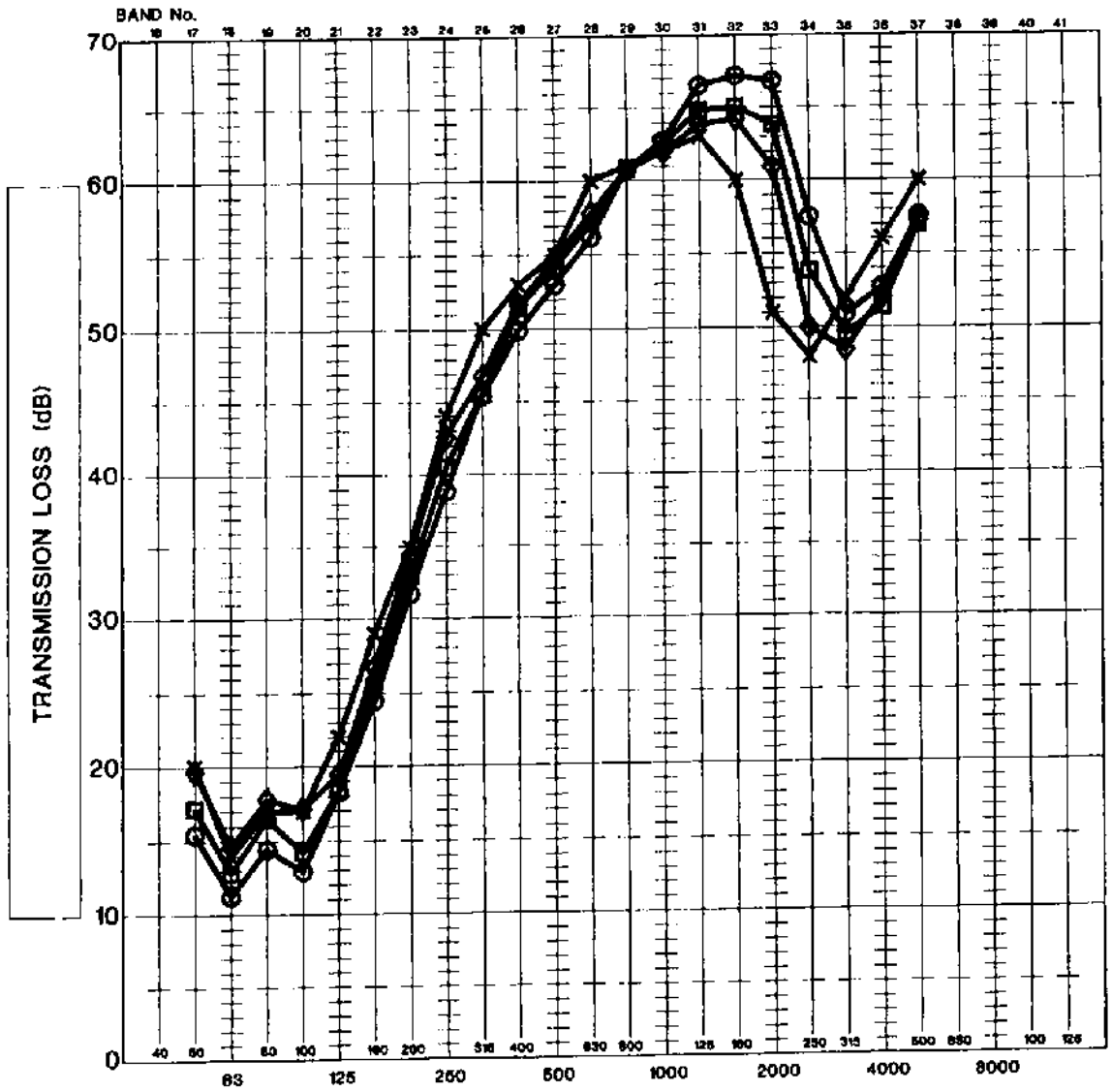
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 4	**FILE NAME** 177GRA004
PROJECT NUMBER 177 011	**DATE** 2001 12

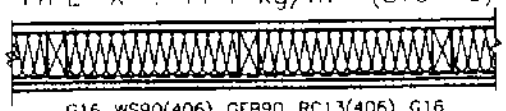
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF WOOD STUDS @ 406 mm
RESILIENT FURRINGS @ 610 mm
GLASS FIBER INSULATION (G1)

G16 TYPE 'X' : 11.1 kg/m² (STC 46)



G16_WS90(406)_GFB90_RC13(406)_G16
TL-93-110

G13 TYPE 'X' : 9.45 kg/m² (STC 43)

G13_WS90(406)_GFB90_RC13(610)_G13
(TL-93-148)

G13 : 8.22 kg/m² (STC 42)

G13_WS90(406)_GFB90_RC13(610)_G13
(TL-93-128)

G13 LIGHT WEIGHT : 7.23 kg/m² (STC 42)

G13_RC13(610)_WS90(406)_GFB90_G13
(TL-94-001)

PROJECT DESCRIPTION

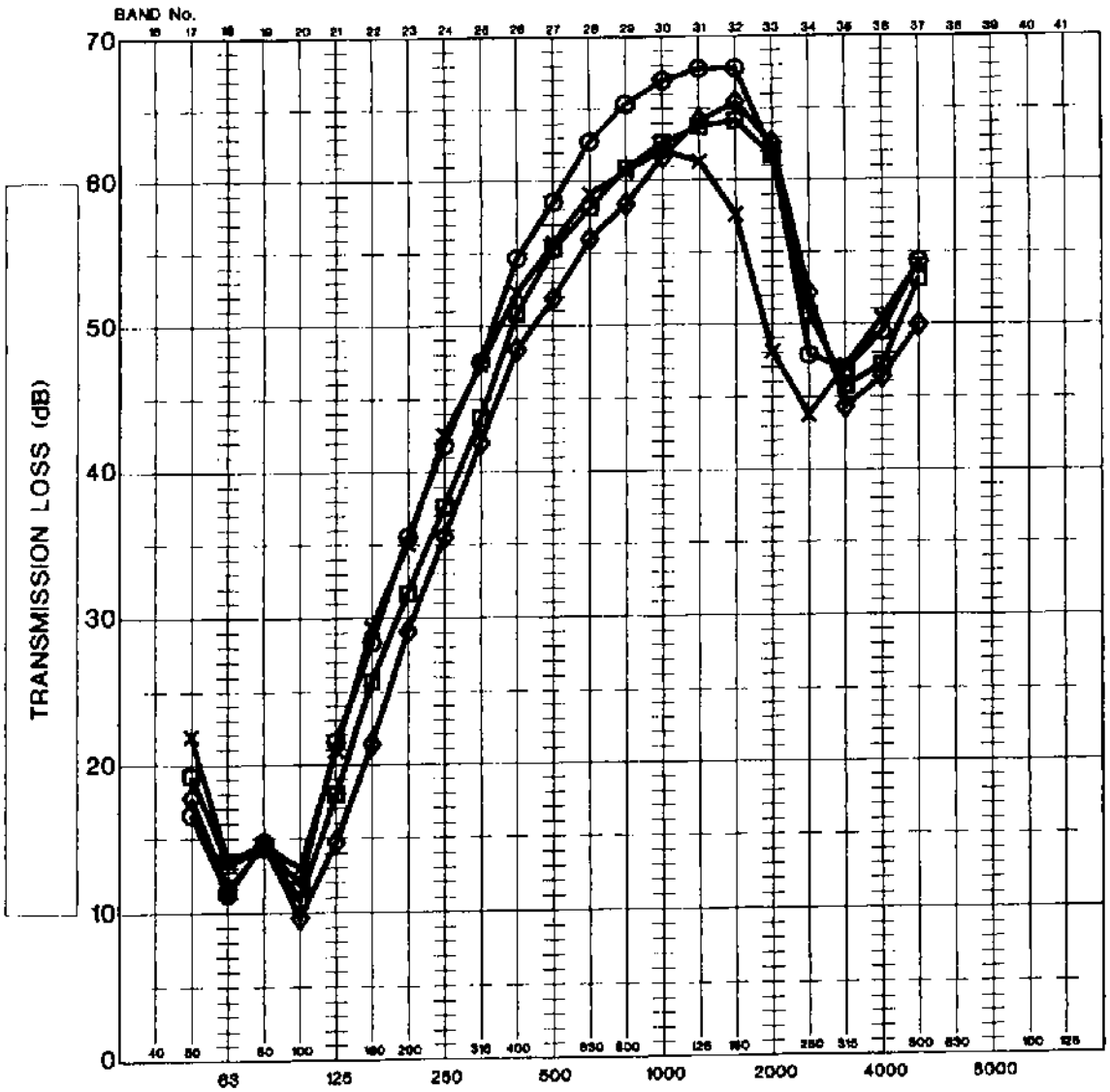
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 5	**FILE NAME** 177GRA005
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



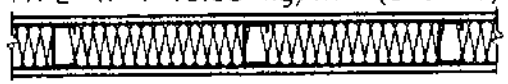
LEGEND

ONE GYPSUM BOARD ON EACH SIDE
90mm STEEL STUDS @ 406 mm
GLASS FIBER INSULATION (G1)

G13 TYPE 'X' 10.17kg/m^2 (STC 46)

G13_5S90(406)_GFB90_G13
(TL-93-344)

G16 TYPE 'X' . 10.93 kg/m^2 (STC 45)



G16_5S90(406)_GFB90_G16
(TL-92-443)

G13 . 8 20 kg/m^2 (STC 42)

G13_5S90(406)_GFB90_G13
(TL-92-428)

G13 LIGHT WEIGHT : 7.31 kg/m^2 (STC 39)

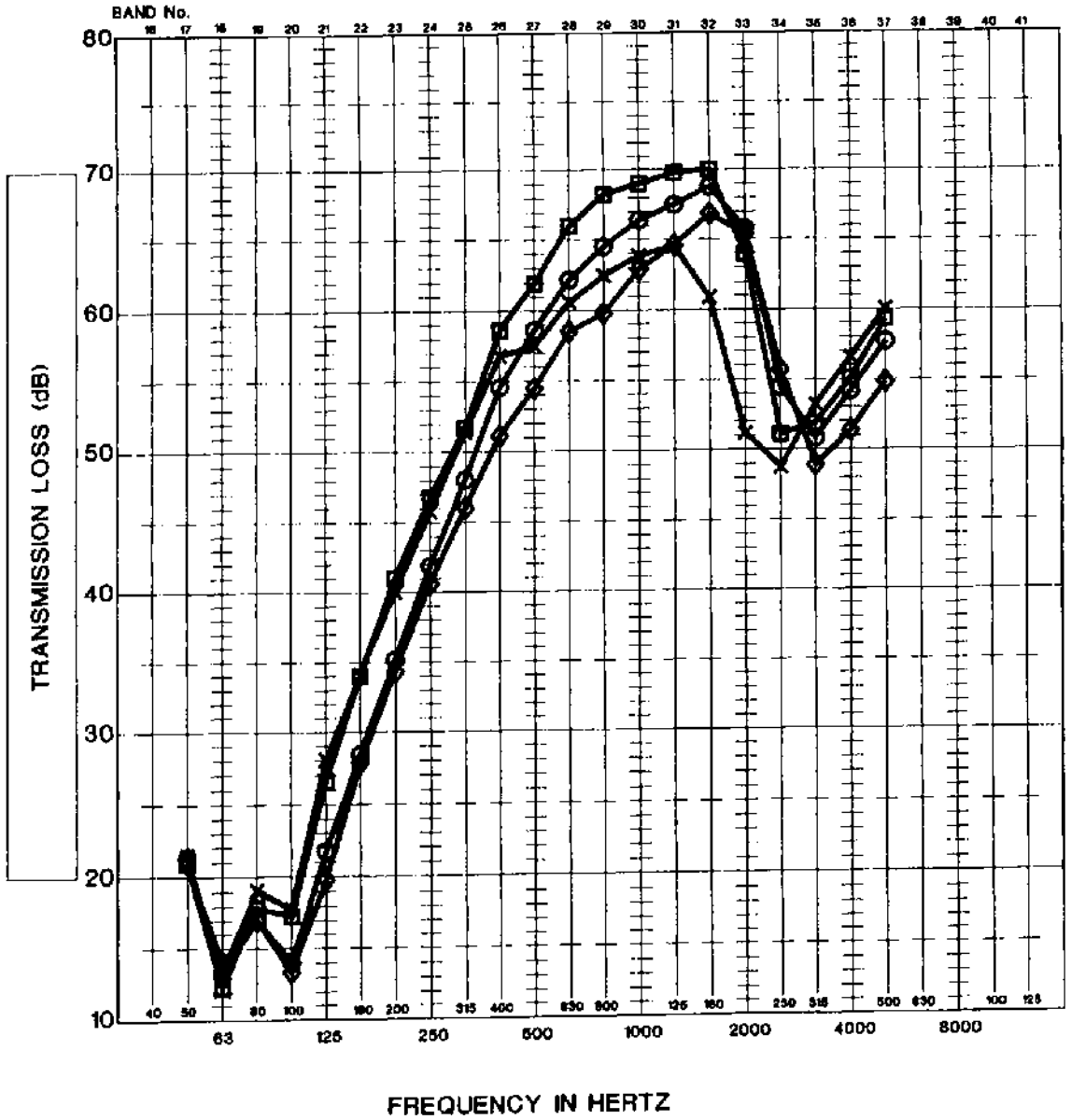
G13_5S90(406)_GFB90_G13
(TL-93-361)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 6	**FILE NAME** 177GRA006
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

ONE GYPSUM BOARD ON ONE SIDE AND 2 BOARDS ON OPPOSITE SIDE
90mm STEEL STUDS @ 406mm
GLASS FIBER INSULATION (G1)

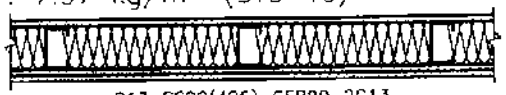
G13 TYPE 'X' - 10.17 kg/m² (STC 51)

G13_SS90(406)_GFB90_2G13
(TL-93-345)

G16 TYPE 'X' - 11.56 kg/m² (STC 52)

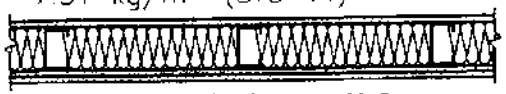
G16_SS90(406)_GFB90_2G16
(TL-93-350)

G13 - 7.97 kg/m² (STC 46)



G13_SS90(406)_GFB90_2G13
(TL-93-366)

G13 - 7.31 kg/m² (STC 44)



G13_SS90(406)_GFB90_2G13
(TL-93-364)

PROJECT DESCRIPTION

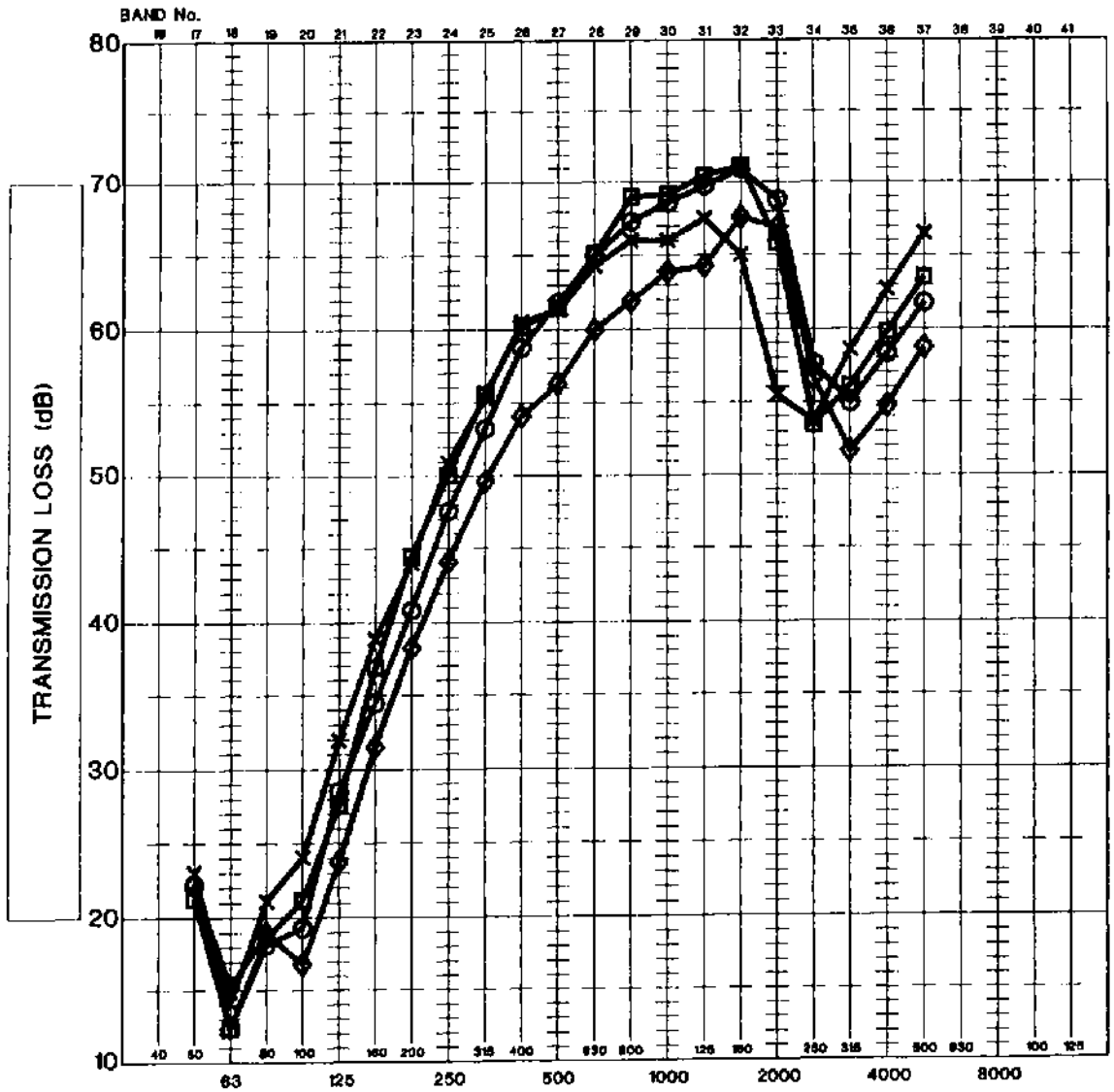
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 7	**FILE NAME** 177GRA007
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

TWO GYPSUM BOARDS ON EACH SIDE
90mm STEEL STUDS @ 406mm
GLASS FIBER INSULATION (G1)

G13 TYPE 'X' : 10.17 kg/m² (STC 52)

2G13_SS90(406)_GFB90_2G13
(TL-93-346)

G16 TYPE 'X' : 11.56 kg/m² (STC 52)

2G16_SS90(406)_GFB90_2G16
(TL-93-351)

G13 : 7.97 kg/m² (STC 53)

2G13_SS90(406)_GFB90_2G13
(TL-93-367)

G13 LIGHT WEIGHT : 7.31 kg/m² (STC 48)

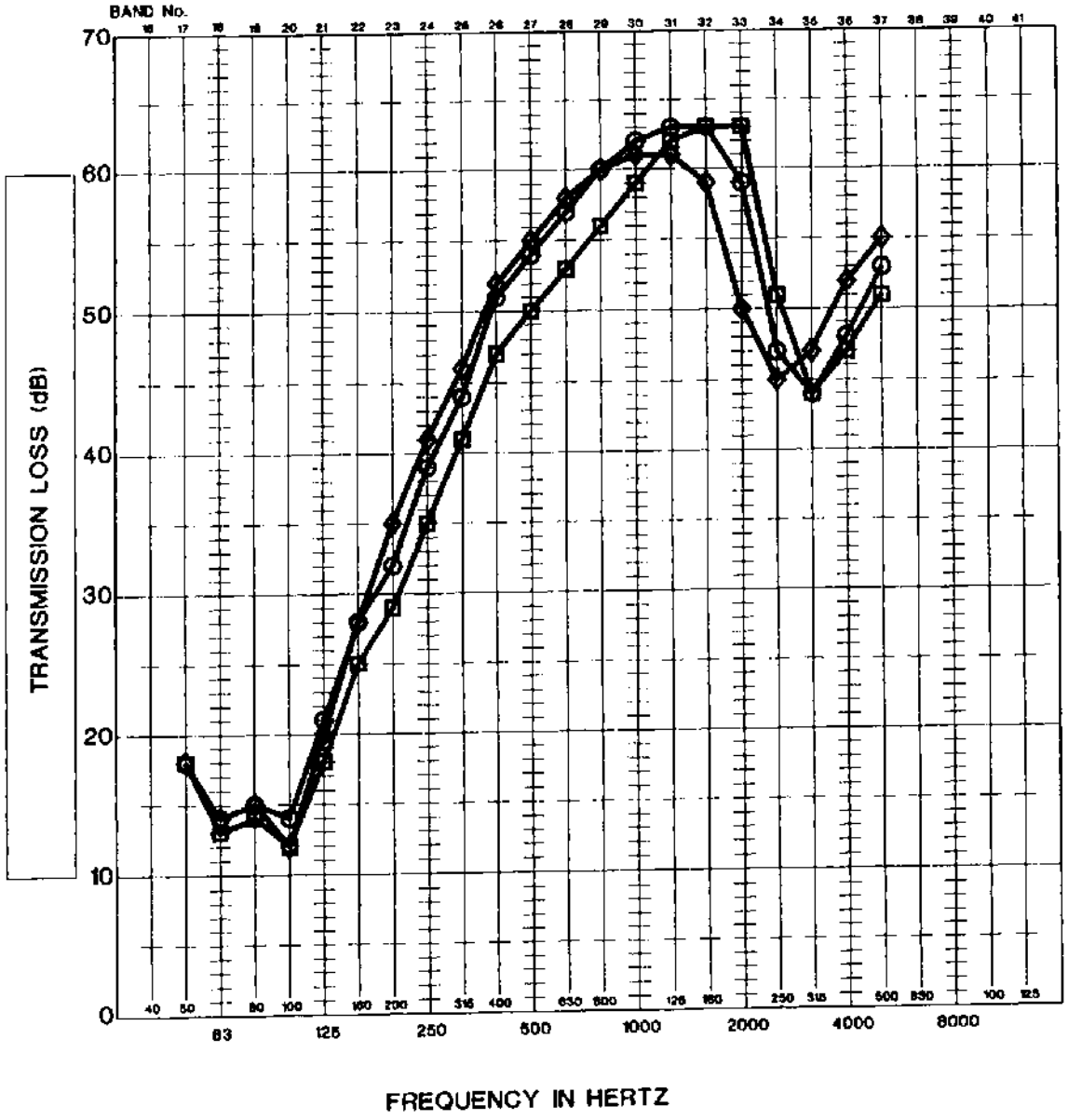
2G13_SS90(406)_GFB90_2G13
(TL-93-363)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 8	**FILE NAME:** 177GRA008
PROJECT NUMBER 177.011	**DATE** 2001 12

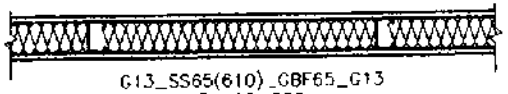
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

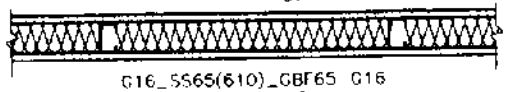
ONE GYPSUM BOARD ON EACH SIDE
65 mm STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

13 mm TYPE 'X' 10 kg/m^2 (STC 45)



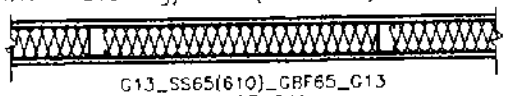
G13_SS65(610)_GBF65_G13
TL-93-036

16 mm TYPE 'X' 11 kg/m^2 (STC 44)



G16_SS65(610)_GBF65 G16
TL-93-033

13 mm 8.3 kg/m^2 (STC 42)



G13_SS65(610)_GBF65_G13
TL-93-041

PROJECT DESCRIPTION

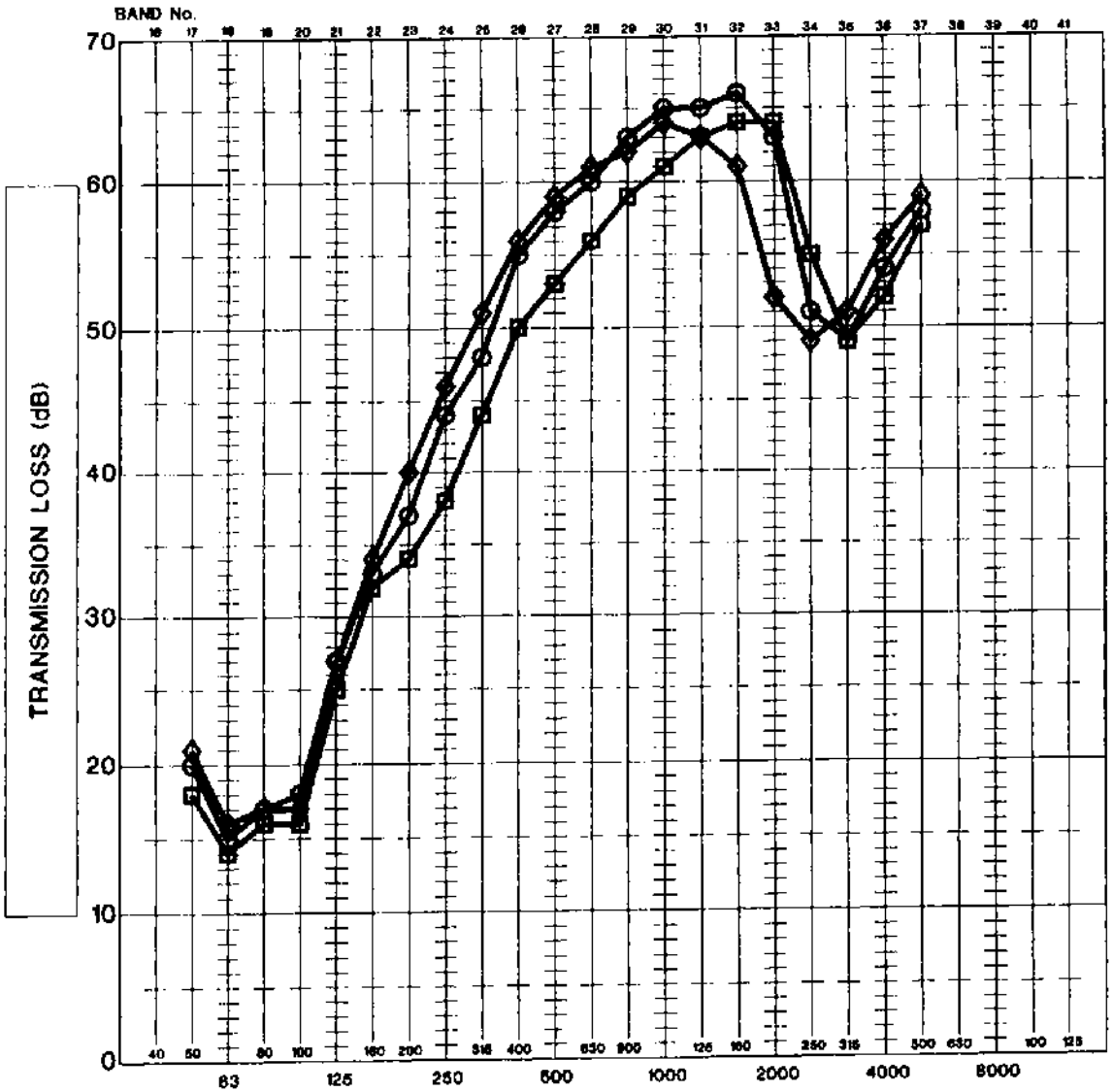
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 9	**FILE NAME** 177GRA009
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

ONE GYPSUM BOARD ON ONE SIDE AND TWO BOARDS ON OPPOSITE SIDE
65mm STEEL STUDS @ 610 mm o.c.
GLASS FIBER INSULATION (G1)

13 mm TYPE 'X' - 10 kg/m^2 (STC 51)

G13_SS65(610)_GFB65_2G13
TL-93-039

16 mm TYPE 'X' 11 kg/m^2 (STC 51)

G16_SS65(610)_GFB65_2G16
TL-93-036

13 mm 8.3 kg/m^2 (STC 49)

G13_SS65(610)_GFB65_2G13
TL-93-045

PROJECT DESCRIPTION

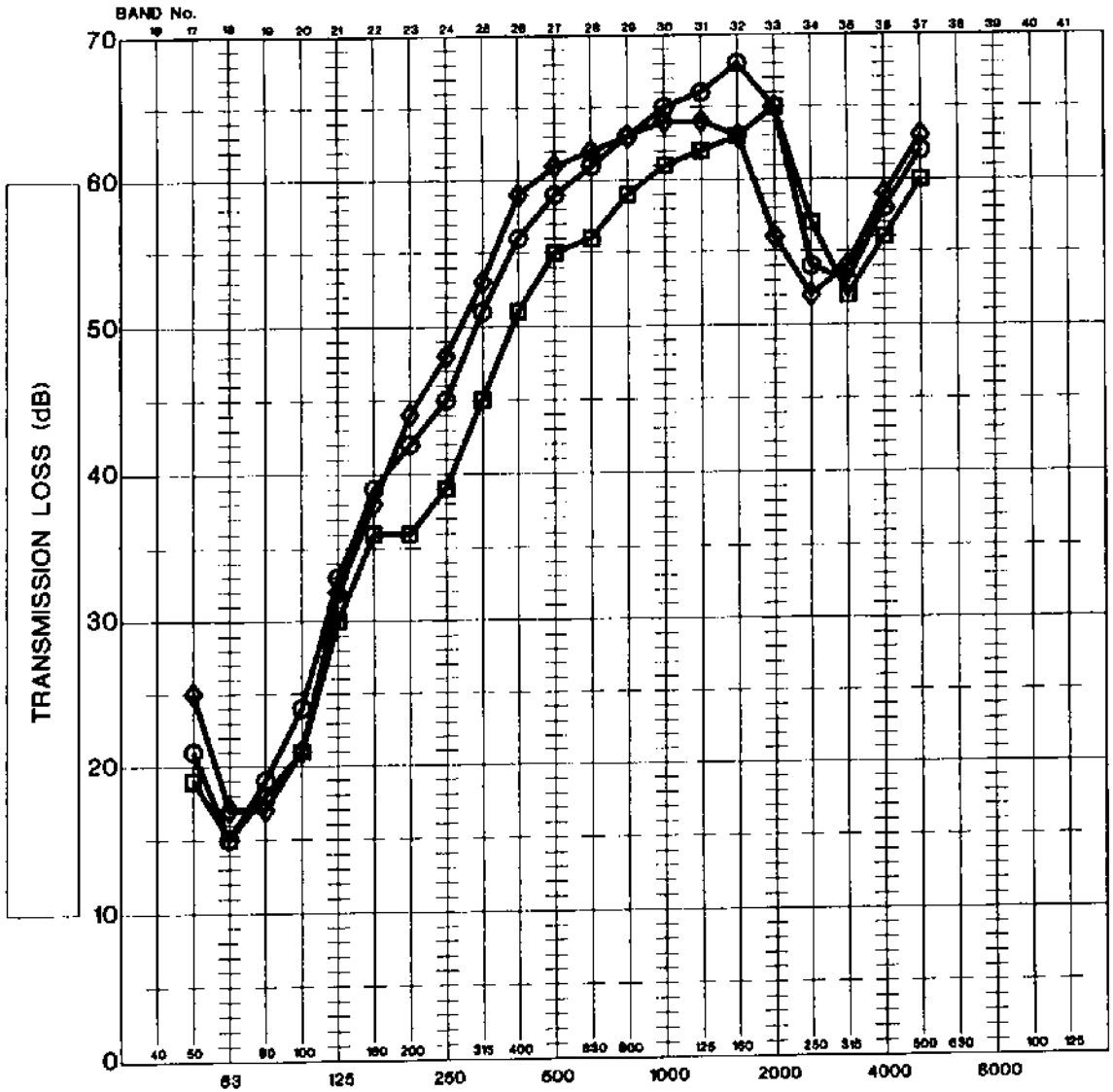
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 10	**FILE NAME** 177GRA010
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

TWO GYPSUM BOARDS ON EACH SIDE
65mm STEEL STUDS @ 610 mm o c
GLASS FIBER INSULATION (G1)

13 mm TYPE 'X' - 10 kg/m^2 (STC 55)

2G13_SS65(610)_GFB65_2G13
TL-93-040

16 mm TYPE 'X' - 11 kg/m^2 (STC 55)

2G16_SS65(610)_GFB65_2G16
TL-93-037

13 mm 8.3 kg/m^2 (STC 52)

2G13_SS65(610)_GFB65_2G13
TL-93-046

PROJECT DESCRIPTION

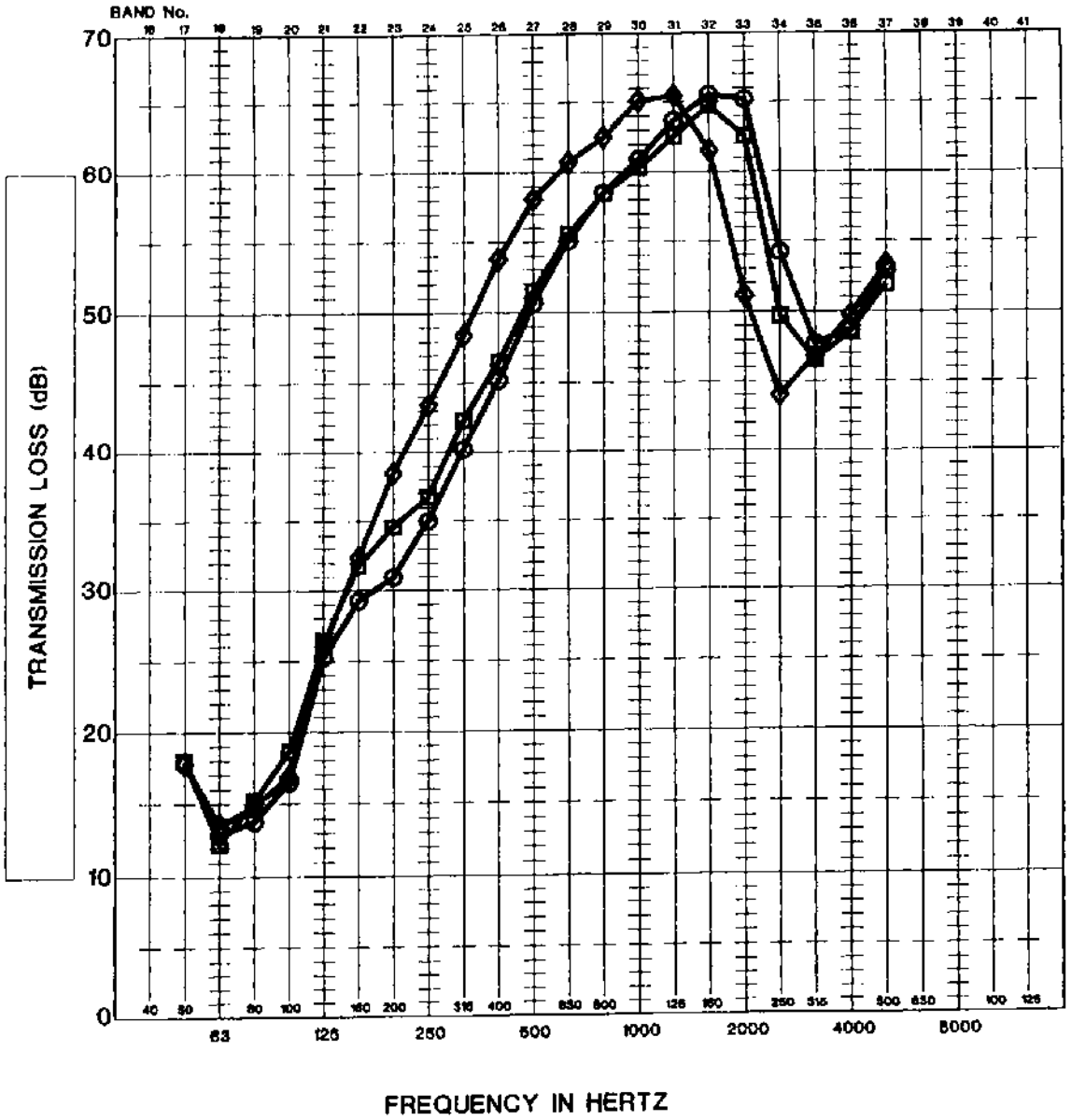
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 11	**FILE NAME** 177GRA011
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

ONE GYPSUM BOARD ON EACH SIDE
90mm STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

16mm TYPE 'X' - 11.2 kg/m² (STC 48)

G16_SS90(610)_GFB90_G16
(TL-92-348)

13mm TYPE 'X' - 10 kg/m² (STC 48)

G13_SS90(610)_GFB90_G13
(TL-92-410)

13mm LIGHT WEIGHT - 8.3 kg/m² (STC 47)

G13_SS90(610)_GFB90_G13
(TL-92-413)

PROJECT DESCRIPTION

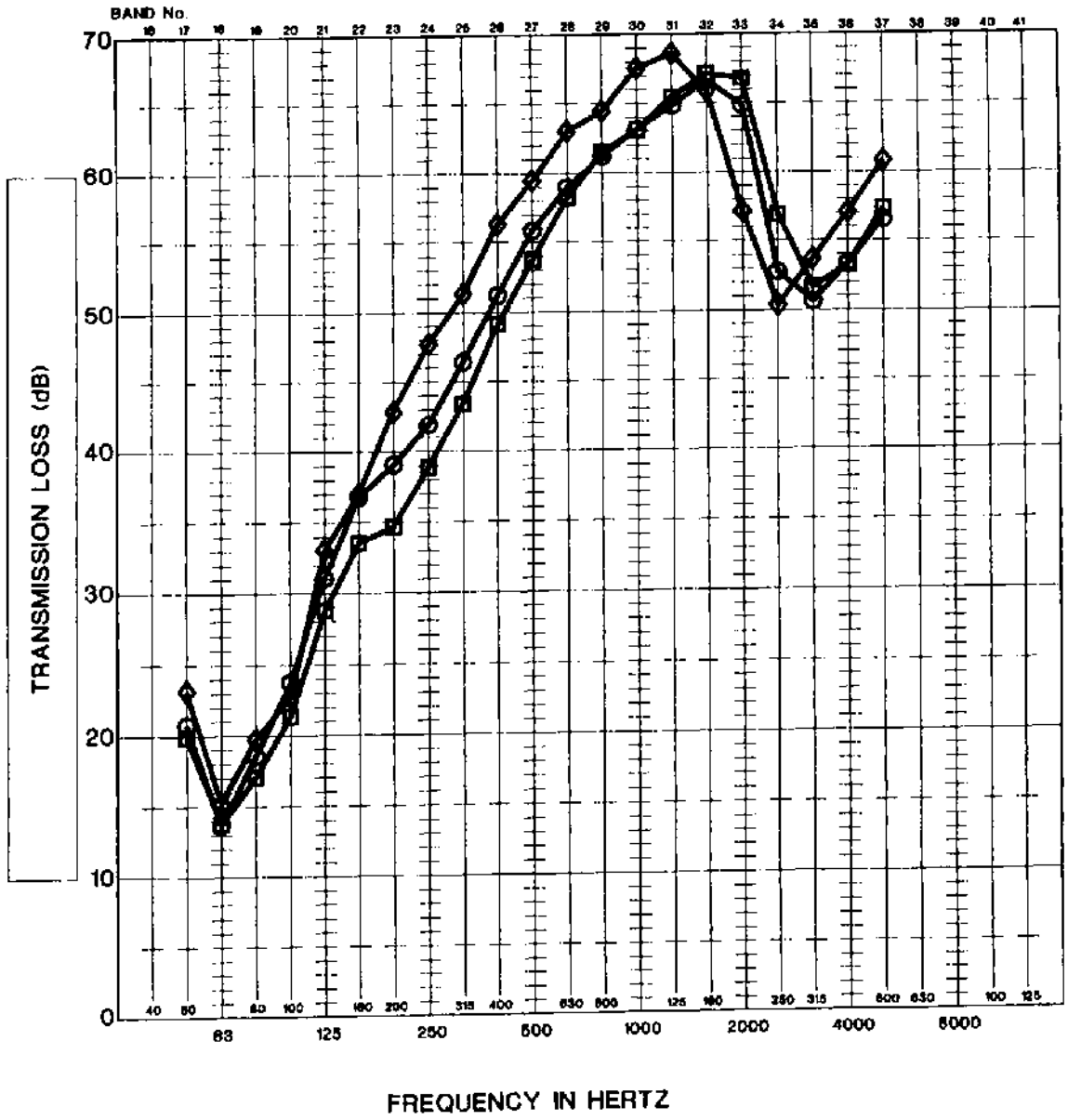
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 12	**FILE NAME** 177GRA012
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

ONE GYPSUM BOARD ON ONE SIDE AND TWO BOARDS ON THE OPPOSITE SIDE
90mm STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

16mm TYPE 'X' - 11.2 kg/m^2 (STC 54)

G16_SS90(610)_GFB90_2G16
(TL-92-368)

13mm TYPE 'X' - 10 kg/m^2 (STC 52)

G13_SS90(610)_GFB90_2G13
(TL-92-411)

13mm LIGHT WEIGHT 7.3 kg/m^2 (STC 51)

G13_SS90(610)_GFB90_2G13
(TL-92-415)

PROJECT DESCRIPTION

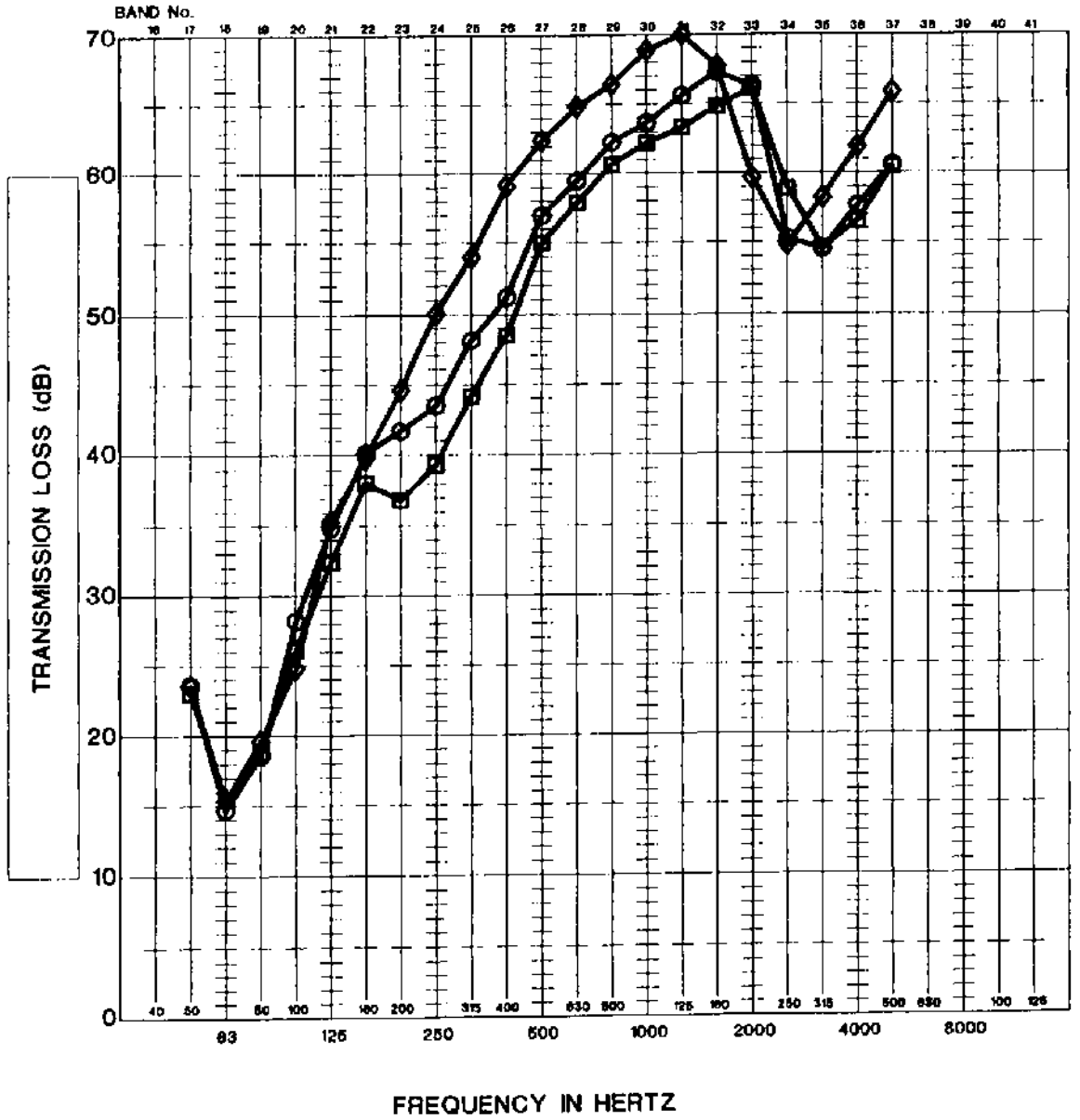
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 13	**FILE NAME** 177GRA013
PROJECT NUMBER 177.011	**DATE** 2001 12

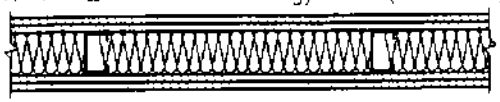
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

TWO GYPSUM BOARDS ON EACH SIDE
90 mm STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

◇——◇ 16mm TYPE 'X' · 11.2 kg/m² (STC 58)



2G16_SS90(610)_GFB90_2G16
(TL-92-369)

○——○ 13mm TYPE 'X' · 10 kg/m² (STC 55)

2G13_SS90(610)_GFB90_2G13
(TL-92-412)

□——□ 13mm LIGHT WEIGHT : 7.3 kg/m² (STC 53)

2G13_SS90(610)_GFB90_2G13
(TL-92-416)

PROJECT DESCRIPTION

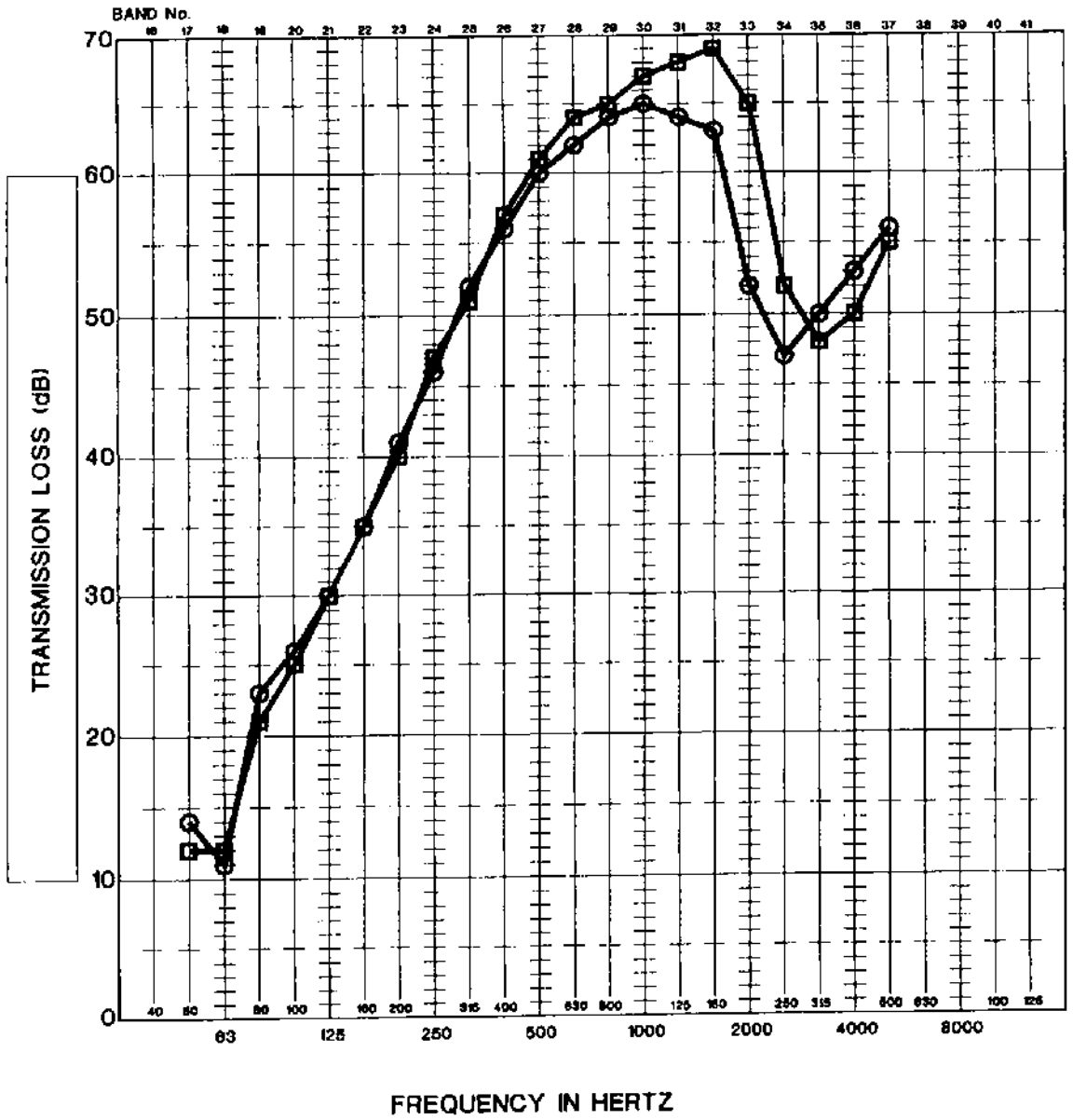
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 14	**FILE NAME** 177GRA014
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



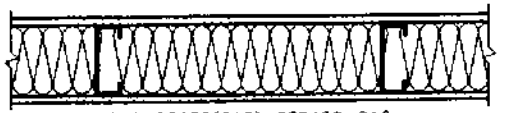
LEGEND

ONE GYPSUM BOARD ON EACH SIDE
150 mm STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

13 mm TYPE 'X' : 10.2 kg/m² (STC 52)

G13_SS150(610)_GFB150_G13
TL-93-299

16 mm TYPE 'X' : 11.6 kg/m² (STC 51)



G16_SS150(610)_GFB150_G16
TL-93-928

PROJECT DESCRIPTION

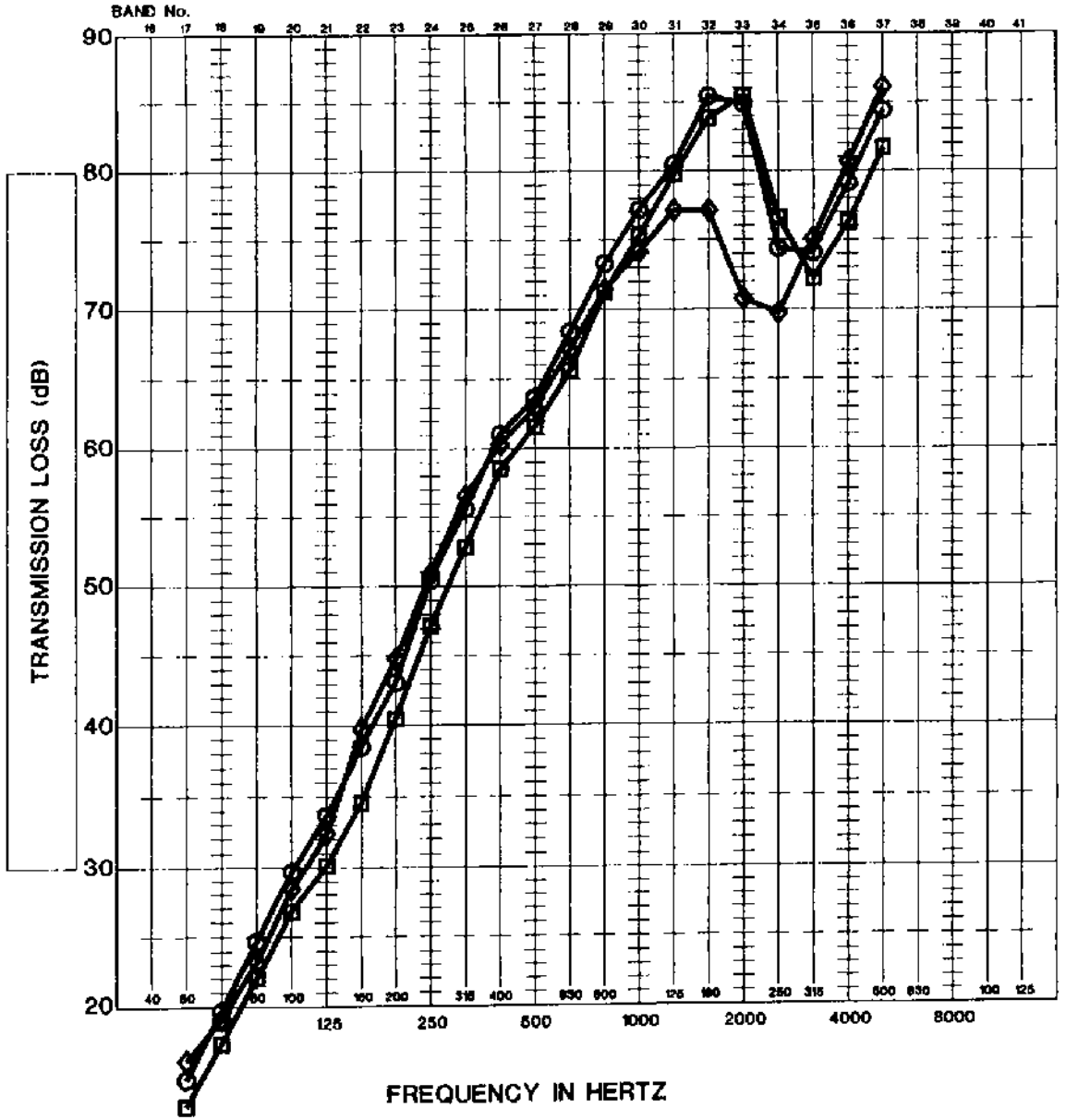
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VAROUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 15	**FILE NAME** 177GRA015
PROJECT NUMBER 177 011	**DATE** 2001 12

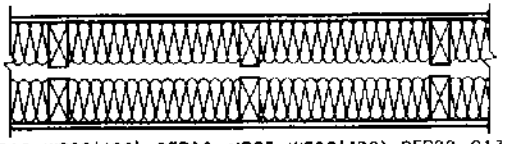
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

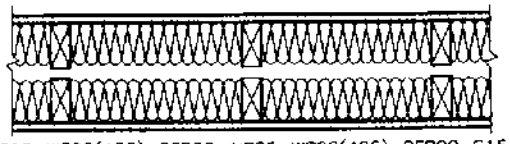
ONE GYPSUM BOARD ON EACH SIDE
DOUBLE ROW OF WOOD STUDS @ 406mm
GLASS FIBER INSULATION (G1)

G13 TYPE 'X' : 10.19 kg/m^2 (STC 58)



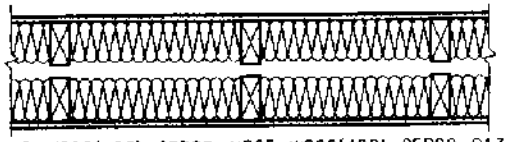
G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G13
(TL-93-270)

G16 TYPE 'X' : 11.52 kg/m^2 (STC 56)



G16_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G16
(TL-93-266)

G13: 8.36 kg/m^2 (STC 54)



G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G13
(TL-93-273)

PROJECT DESCRIPTION

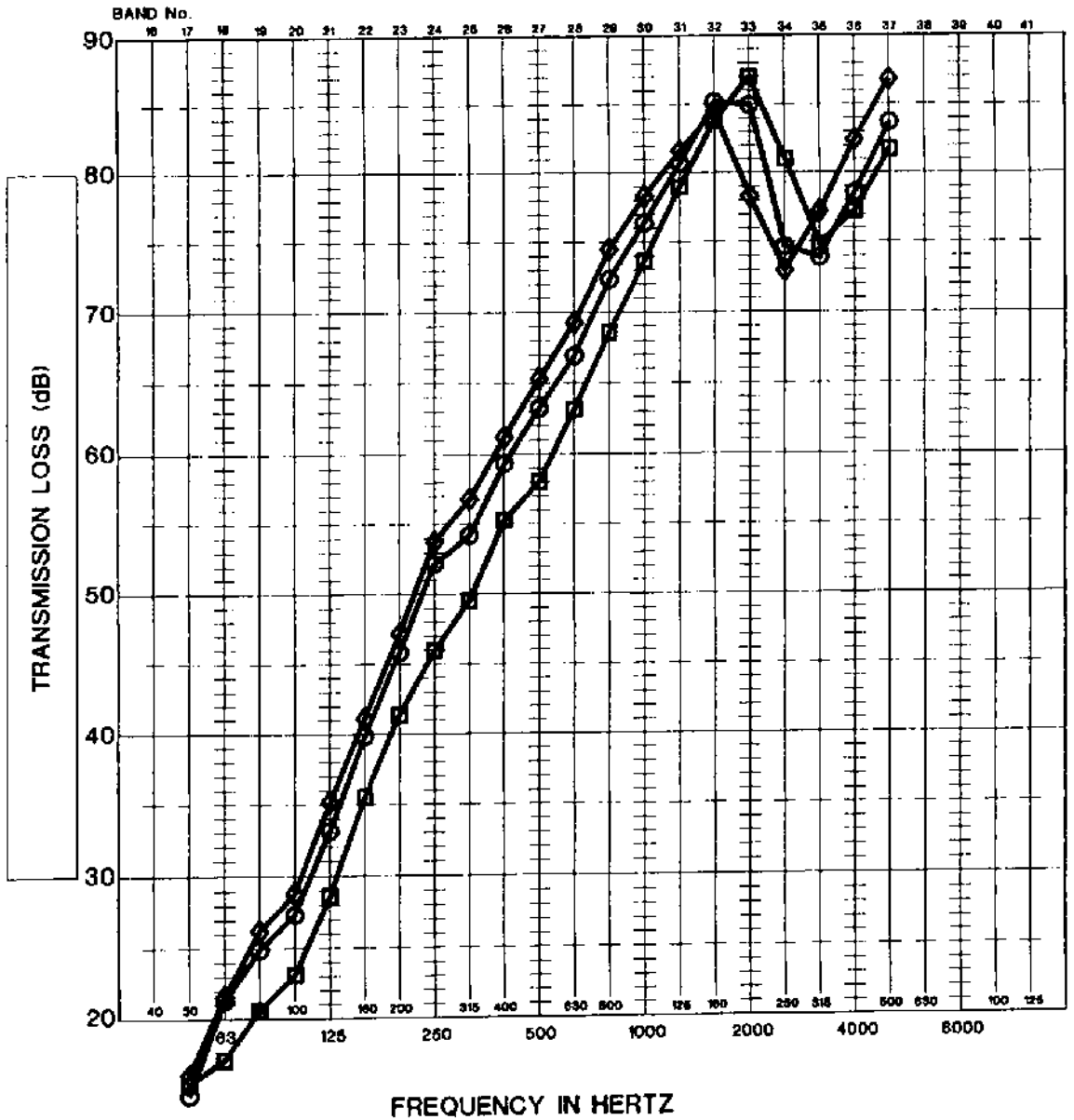
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 16	**FILE NAME:** 177GRA016
PROJECT NUMBER 177.011	**DATE** 2001 12

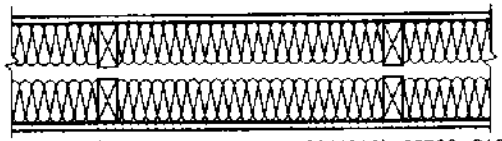
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

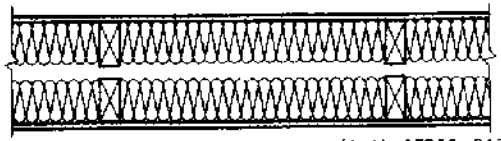
ONE GYPSUM BOARD ON EACH SIDE
DOUBLE ROW OF WOOD STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

16mm TYPE 'X' : 11.5 kg/m² (STC 59)



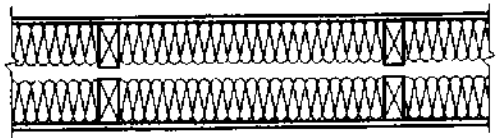
G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G16
(TL-93-292)

13mm TYPE 'X' : 10 kg/m² (STC 57)



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-288)

13mm LIGHT WEIGHT: 7.6 kg/m² (STC 53)



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-291)

PROJECT DESCRIPTION

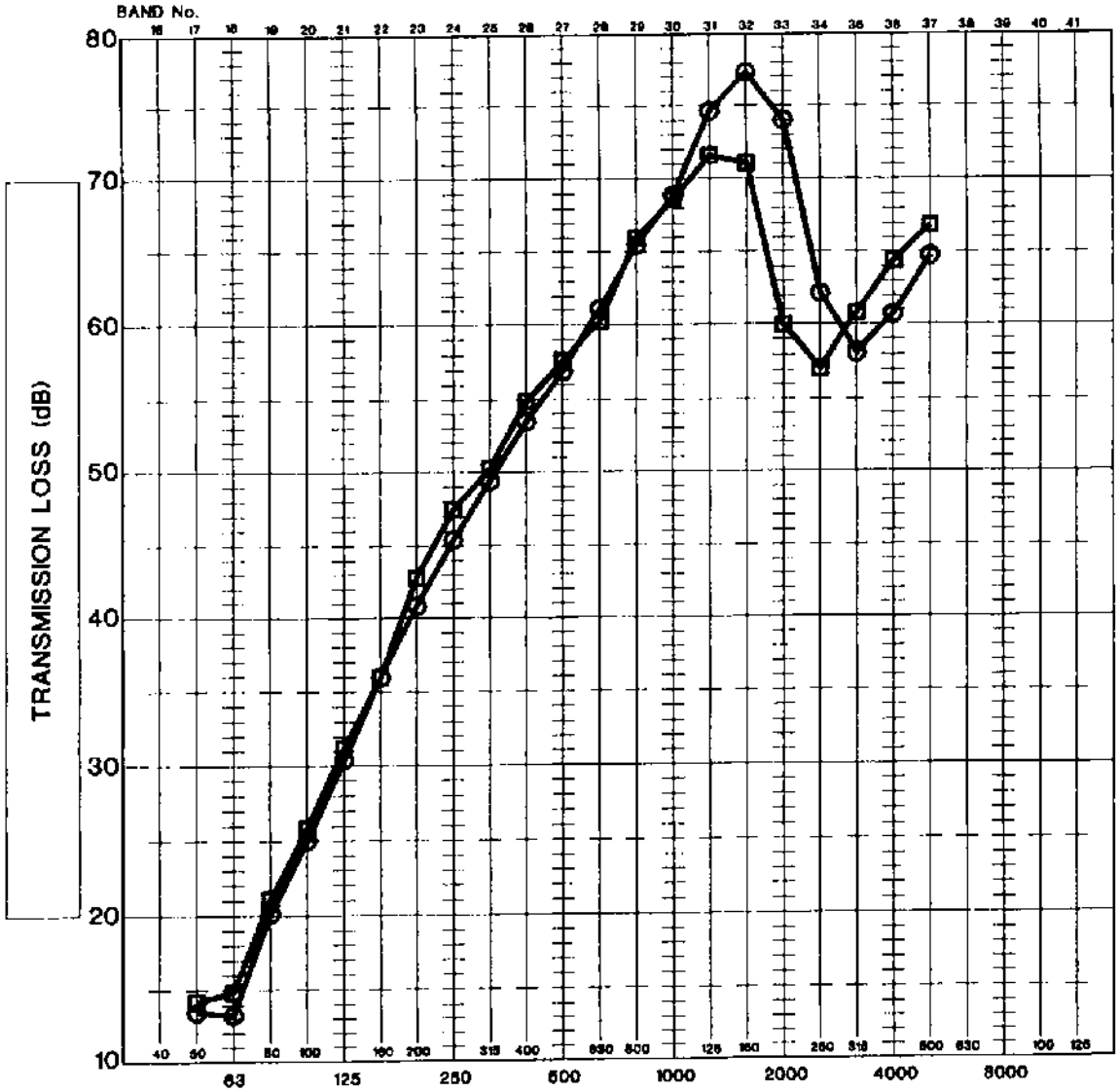
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 17	**FILE NAME** 177GRA017
PROJECT NUMBER 177 011	**DATE** 2001 12

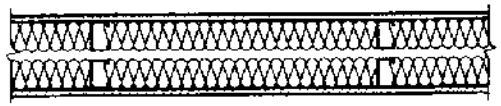
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

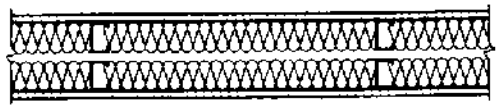
ONE GYPSUM BOARD ON EACH SIDE
DOUBLE ROW OF 65mm STEEL
STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

G13 TYPE 'X' : 10.34 kg/m² (STC 54)



G13_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_G13
(TL-93-303)

G16 TYPE 'X' : 11.43 kg/m² (STC 55)



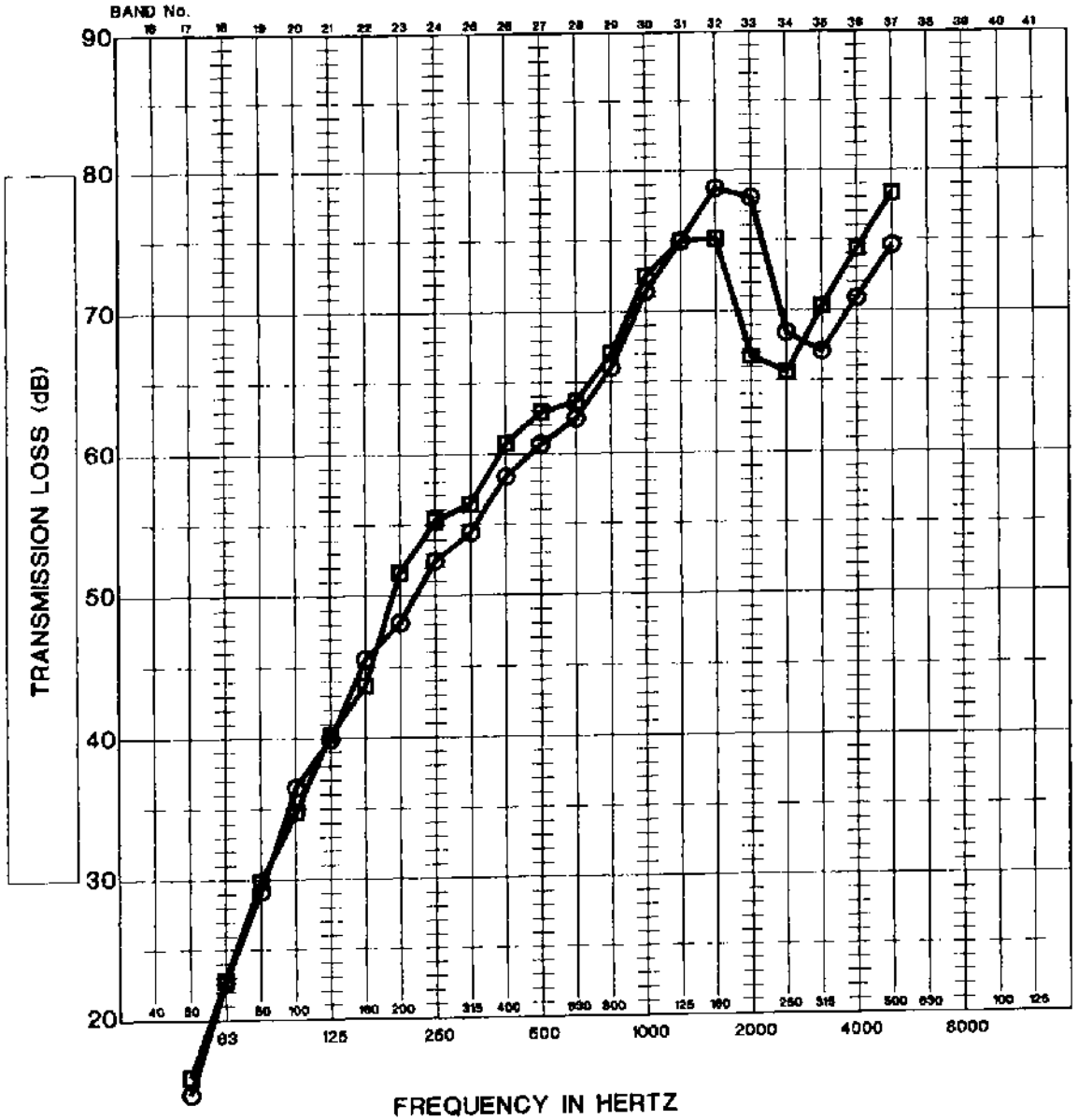
G16_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_G16
(TL-93-300)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 18	**FILE NAME:** 177GRA018
PROJECT NUMBER 177 011	**DATE** 2001 12

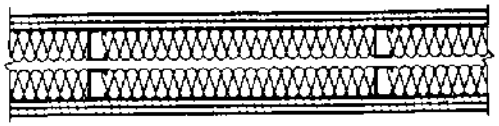
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

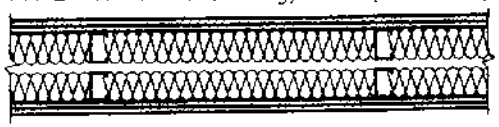
TWO GYPSUM BOARDS ON EACH SIDE
DOUBLE ROW OF 65mm STEEL
STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

G16 TYPE 'X' : 11.43 kg/m^2 (STC 64)



2G16_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_2G16
(TL-93-302)

G13 TYPE 'X' : 10.34 kg/m^2 (STC 62)



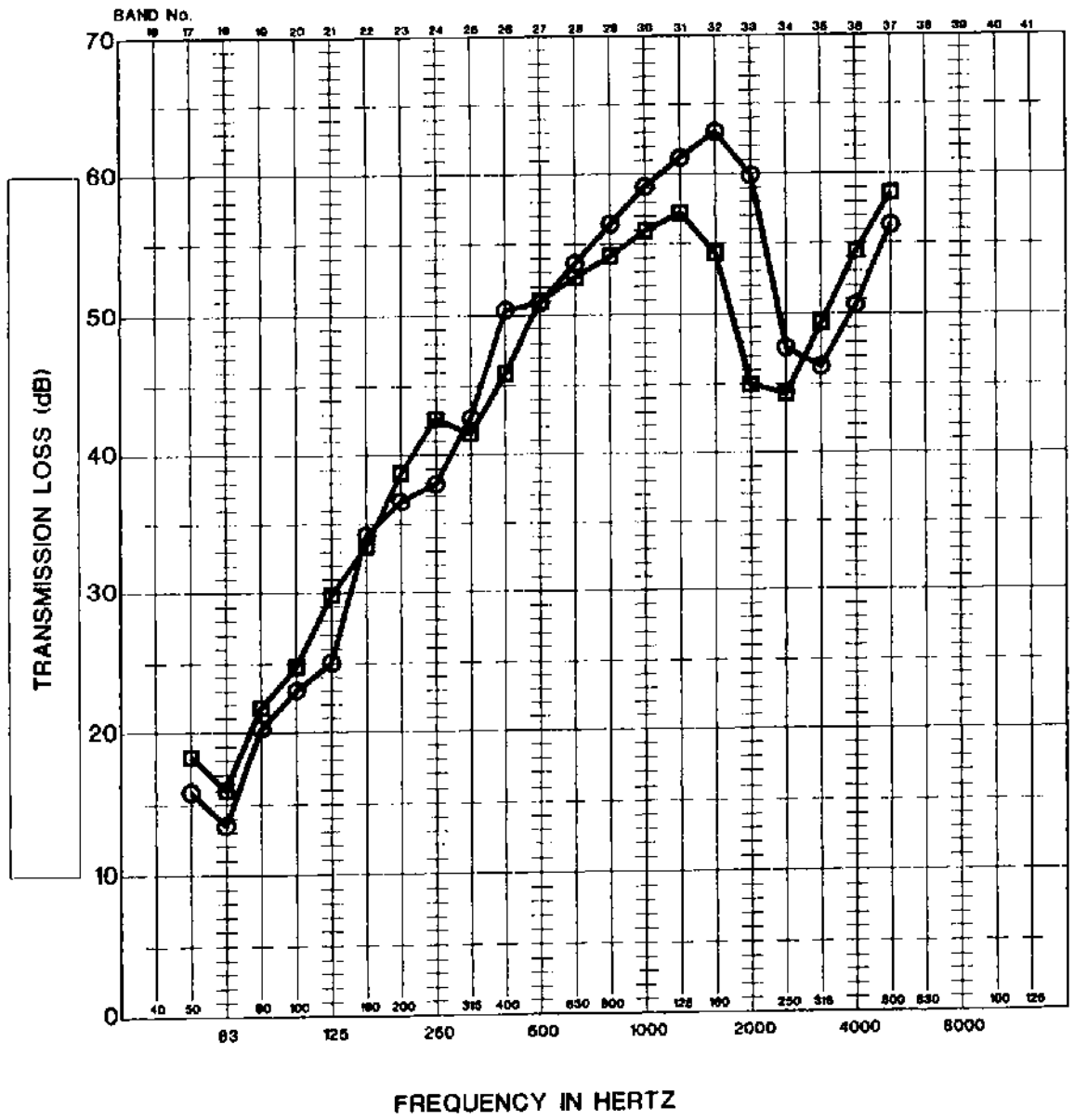
2G13_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_2G13
(TL-93-305)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 19	**FILE NAME** 177GRA019
PROJECT NUMBER 177 011	**DATE** 2001 12

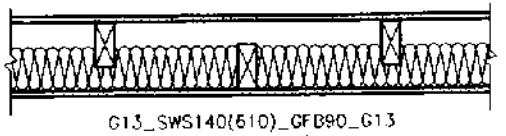
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

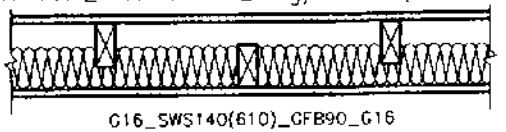
ONE GYPSUM BOARD ON EACH SIDE
STAGGERED WOOD STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

13mm TYPE 'X' : 10 kg/m² (STC 49)



G13_SWS140(610)_GFB90_G13
(TL-93-257)

16mm TYPE 'X' : 11.2 kg/m² (STC 48)



G16_SWS140(610)_GFB90_G16
(TL-93-256)

PROJECT DESCRIPTION

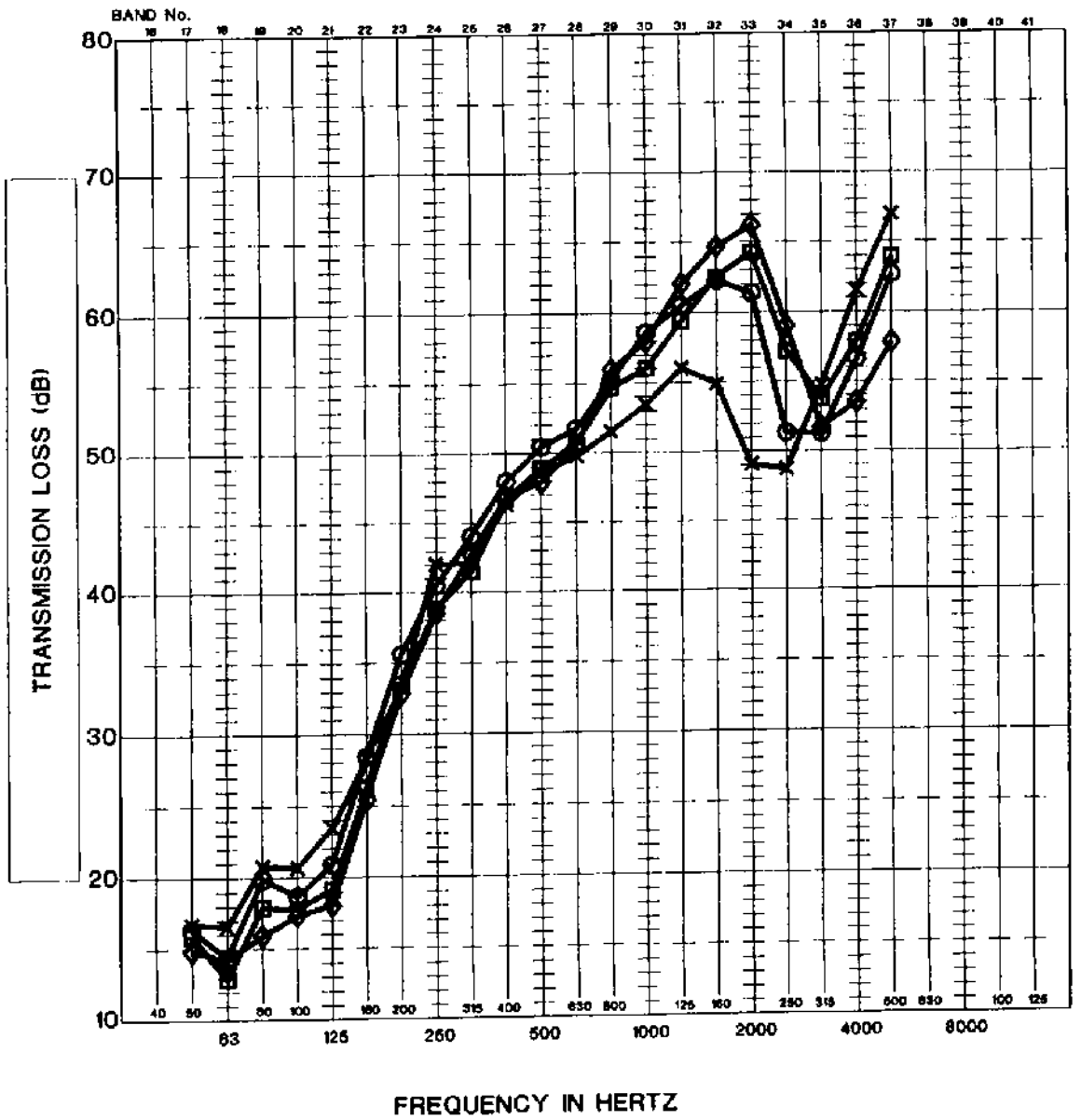
NOISE ISOLATION PROVIDED BY BYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 20	**FILE NAME** 177GRA020
PROJECT NUMBER 177 011	**DATE** 2001 12

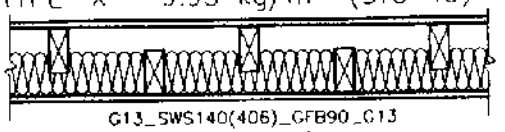
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

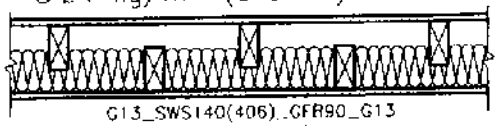
ONE GYPSUM BOARD ON EACH SIDE
STAGGERED WOOD STUDS @ 406 mm
GLASS FIBER INSULATION (G1)

G13 TYPE 'X' 9.95 kg/m² (STC 45)



G13_SWS140(406)_GFB90_G13
(TL-93-208)

G13 8.24 kg/m² (STC 43)

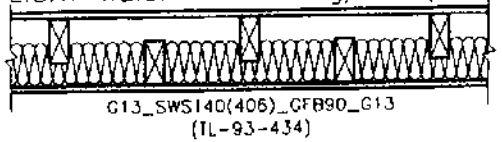


G13_SWS140(406)_GFB90_G13
(TL-93-228)

G16 TYPE 'X' : 11.35 kg/m² (STC 47)

G16_SWS140(406)_GFB90_G16
(TL-93-225)

G13 LIGHT WEIGHT : 7.34 kg/m² (STC 42)



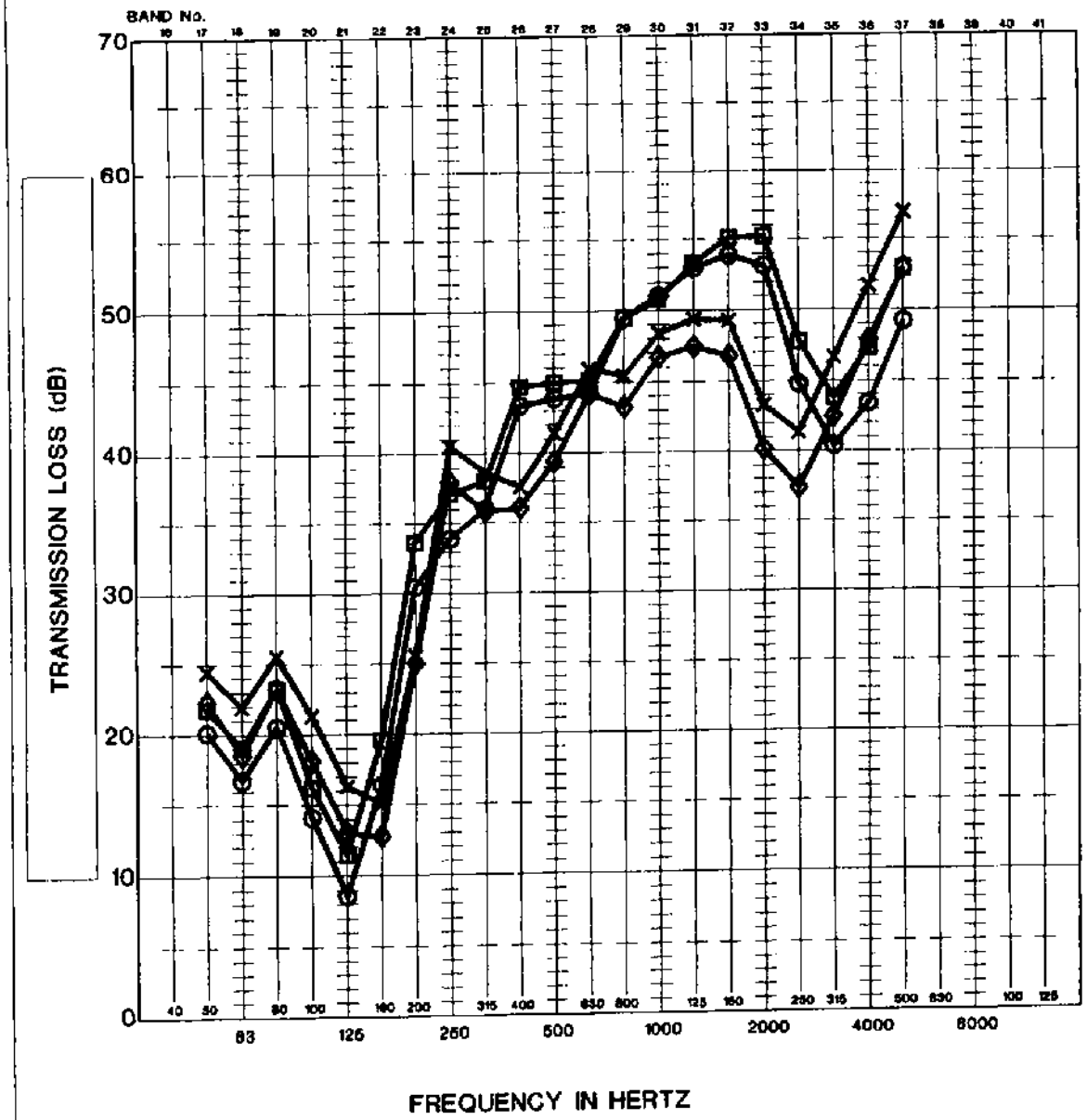
G13_SWS140(406)_GFB90_G13
(TL-93-434)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF USING VARIOUS GYPSUM BOARD THICKNESSES

GRAPH NUMBER 21	**FILE NAME** 177GRA021
PROJECT NUMBER 177 011	**DATE** 2001 12

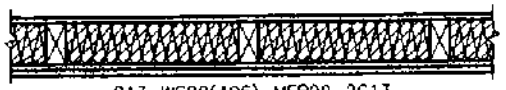
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF WOOD STUDS @ 406mm
MINERAL FIBER INSULATION (M1)

STC 35

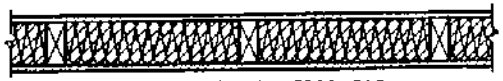


G13_WS90(406)_MFB90_2G13
(TL-93-167)

STC 36

G16_WS90(406)_MFB90_2G16
(TL-93-158)

STC 33



G13_WS90(406)_MFB90_G13
(TL-93-166)

STC 34

G16_WS90(406)_MFB90_G16
(TL-93-157)

PROJECT DESCRIPTION

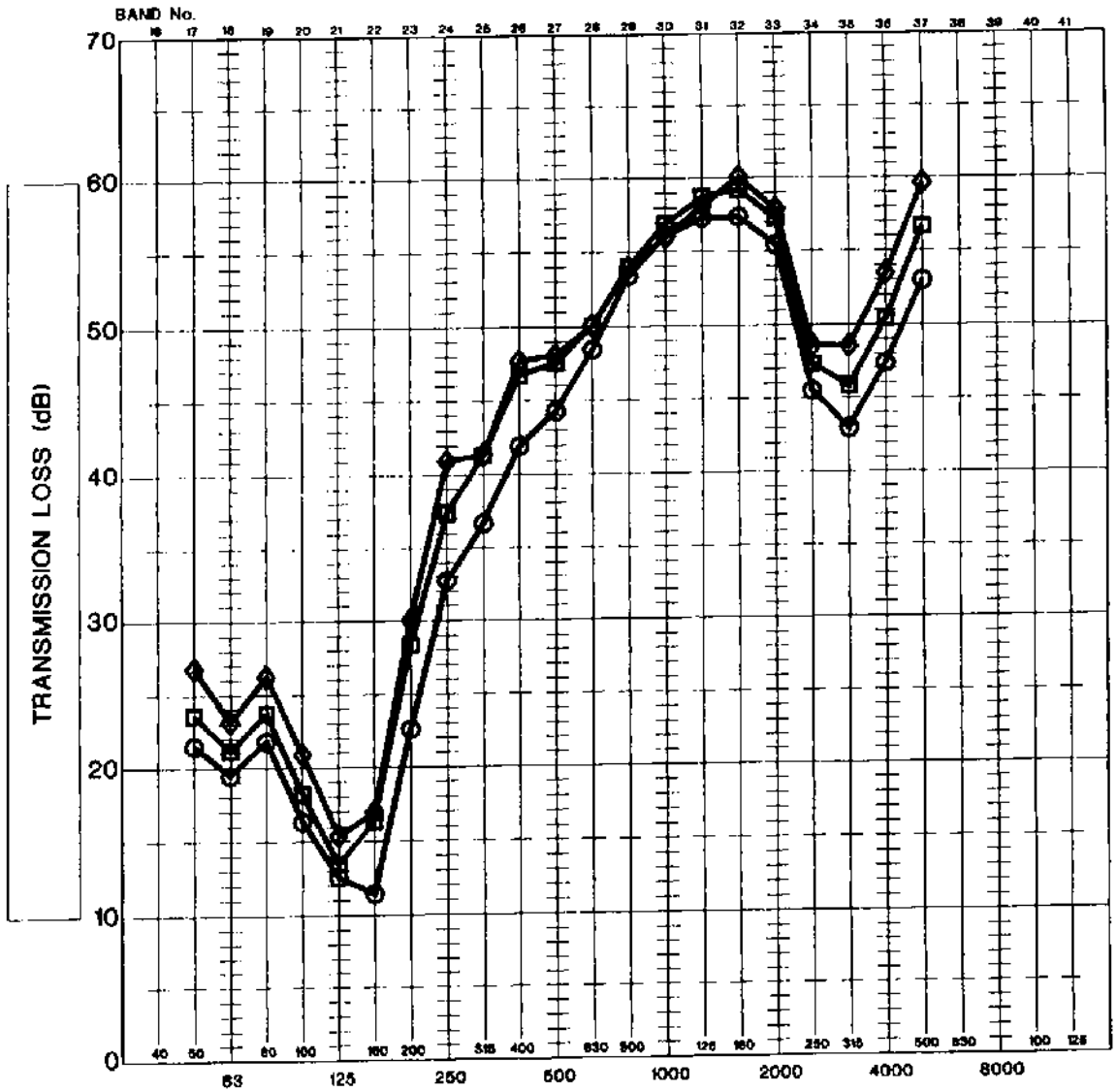
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 22	**FILE NAME** 177GRA022
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF WOOD STUDS @ 406 mm
BLOWN-IN CELLULOSE INSULATION (C2)
13mm TYPE 'X' GYPSUM BOARDS

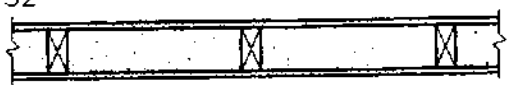
STC 38

2G13_WS90(406)_CFL90_2G13
(TL-93-174)

STC 37

G13_WS90(406)_CFL90_2G13
(TL-93-175)

STC 32



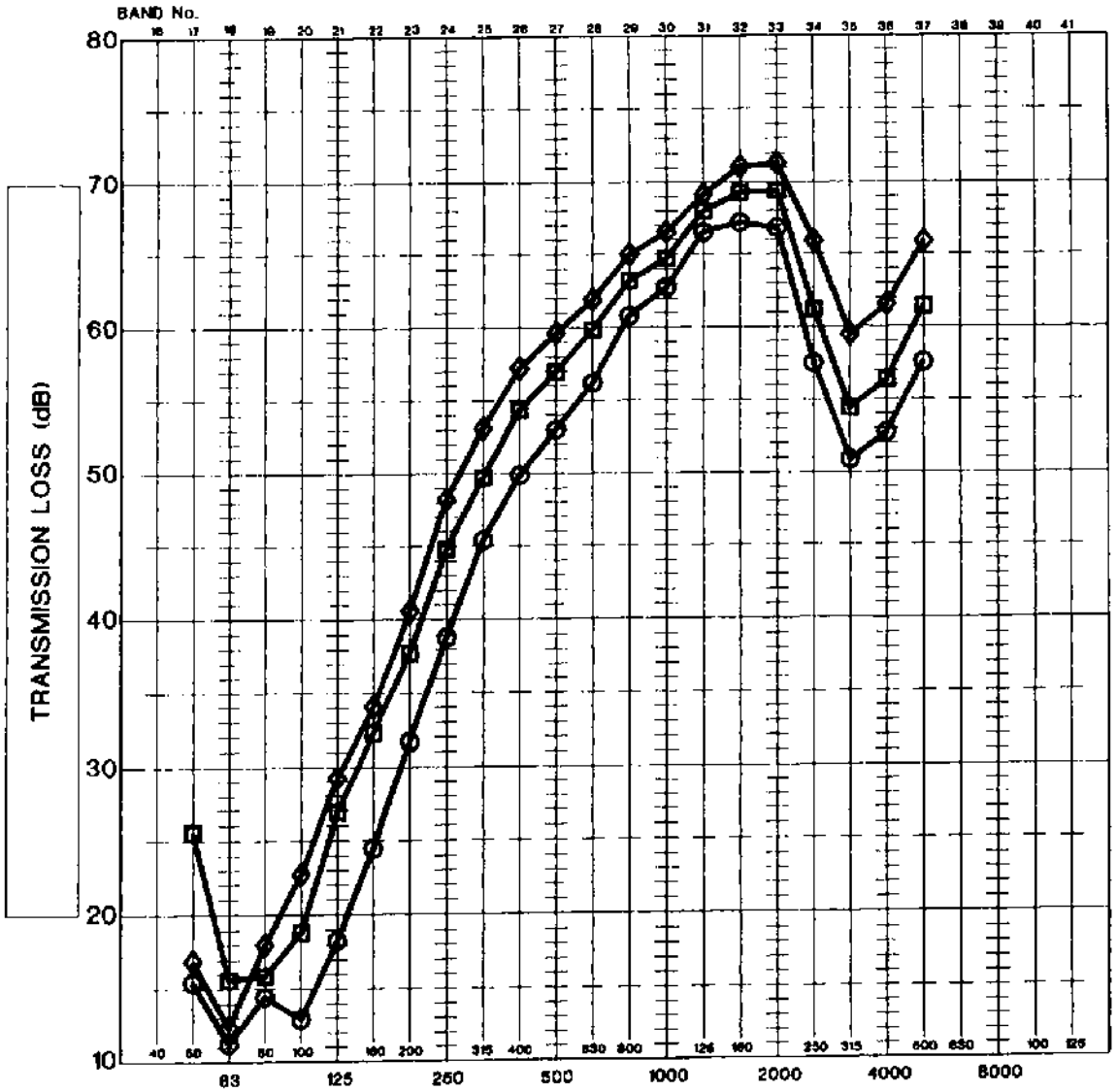
G13_WS90(406)_CFL90_G13
(TL-93-175)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 23	**FILE NAME** 177GRA023
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF WOOD STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
13 mm LIGHT WEIGHT GYPSUM BOARDS
RESILIENT CHANNELS @ 610 mm

STC 53

2G13_RC13(610)_WS90(406)_GFB90_2G13
(TL-94-004)

STC 48

G13_RC13(610)_WS90(406)_GFB90_2G13
(TL-94-002)

STC 42

G13_RC13(610)_WS90(406)_GFB90_G13
(TL-94-001)

PROJECT DESCRIPTION

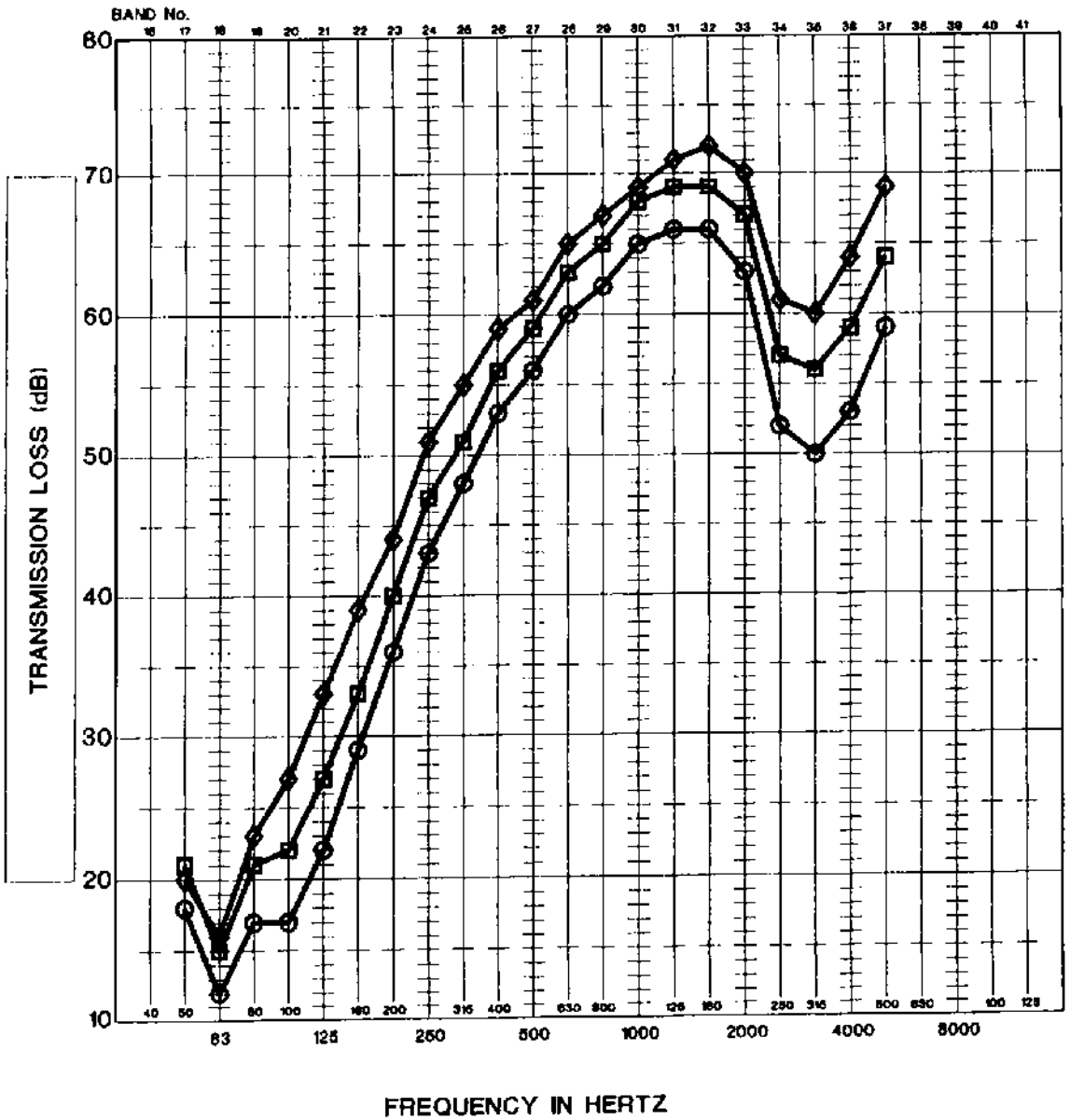
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 24	**FILE NAME** 177GRA024
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF WOOD STUDS @ 406mm
RESILIENT CHANNELS @ 610mm
GLASS FIBER INSULATION (G1)
13mm TYPE 'X' GYPSUM BOARDS: 9.9 kg/m^2

STC 57

2G13_WS90(406)_GFB90_RC13(610)_2G13
(TL-93-127)

STC 51

G13_WS90(406)_GFB90_RC13(610)_2G13
(TL-93-126)

STC 46

G13_WS90(406)_GFB90_RC13(610)_G13
(TL-93-125)

PROJECT DESCRIPTION

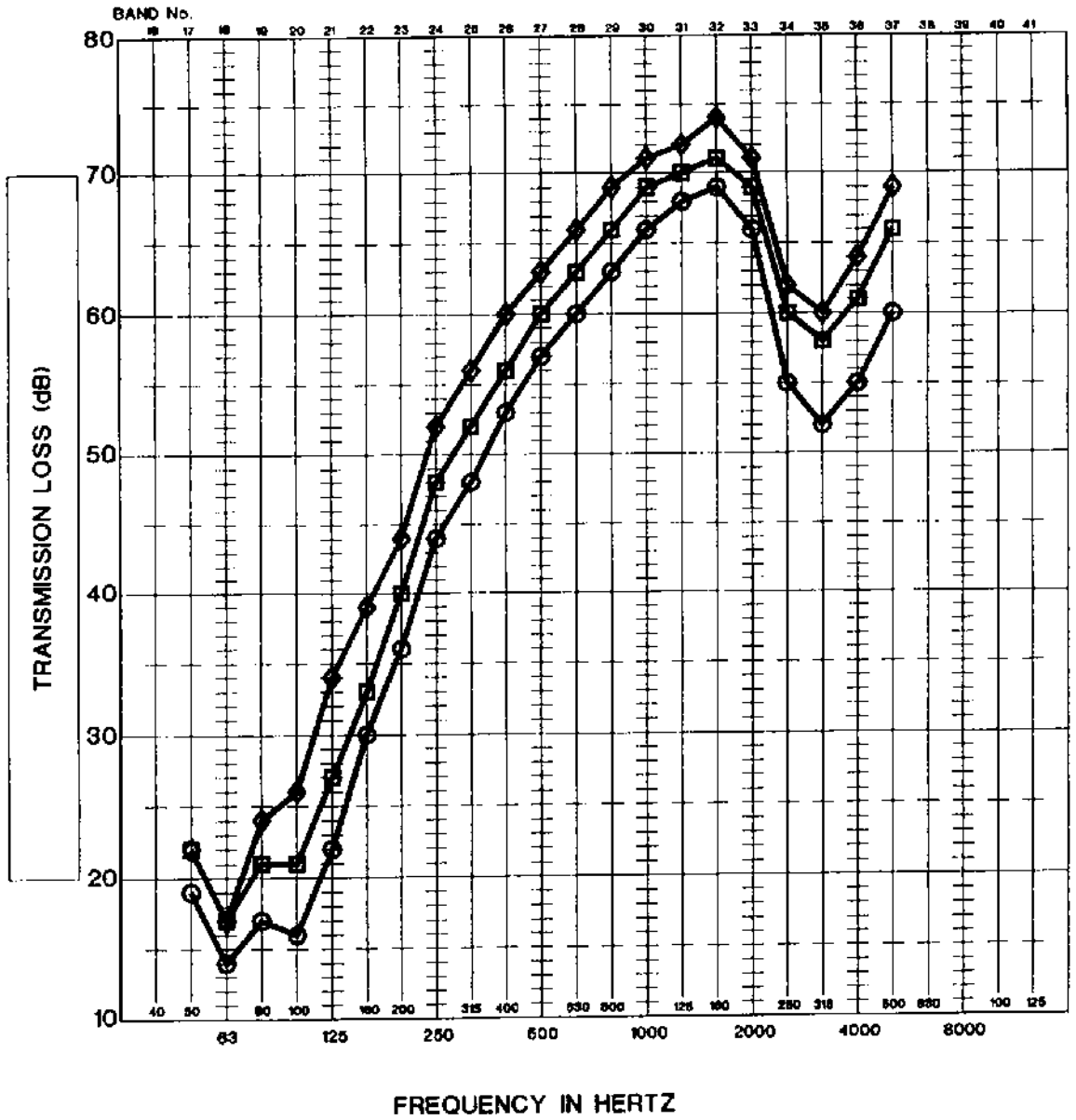
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 25	**FILE NAME** 177GRA025
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF WOOD STUDS @ 406 mm
GLASS FIBER INSULATION (G2)
RESILIENT CHANNELS @ 610 mm
13 mm TYPE 'X' GYPSUM : 10.0 kg/m^2

STC 58

2G13_WS90(406)_GFB90_RC13(610)_2G13
(TL-93-181)

STC 51

G13_WS90(406)_GFB90_RC13(610)_2G13
(TL-93-180)

STC 46

G13_WS90(406)_GFB90_RC13(610)_G13
(TL-93-179)

PROJECT DESCRIPTION

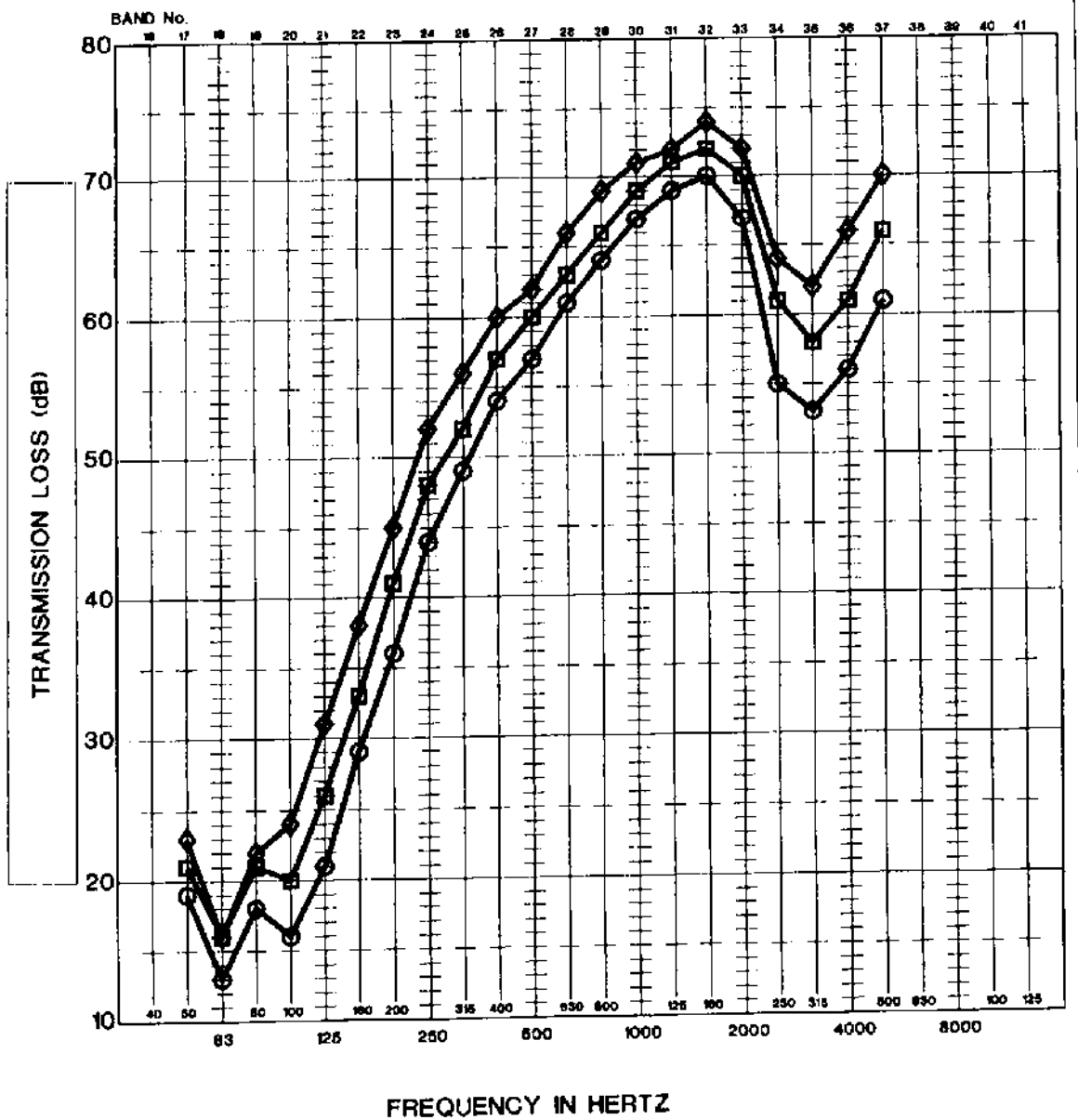
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 26	**FILE NAME** 177GRA026
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF WOOD STUDS @ 406 mm
MINERAL FIBER INSULATION (M1)
RESILIENT CHANNELS @ 610
13 mm TYPE 'X' GYPSUM, 10.1 kg/m^2

STC 55

2G13_WS90(406)_MFB90_RC13(610)_2G13
(TL-93-187)

STC 50

G13_WS90(406)_MFB90_RC13(610)_2G13
(TL-93-186)

STC 45

G13_WS90(406)_MFB90_RC13(610)_G13
(TL-93-185)

PROJECT DESCRIPTION

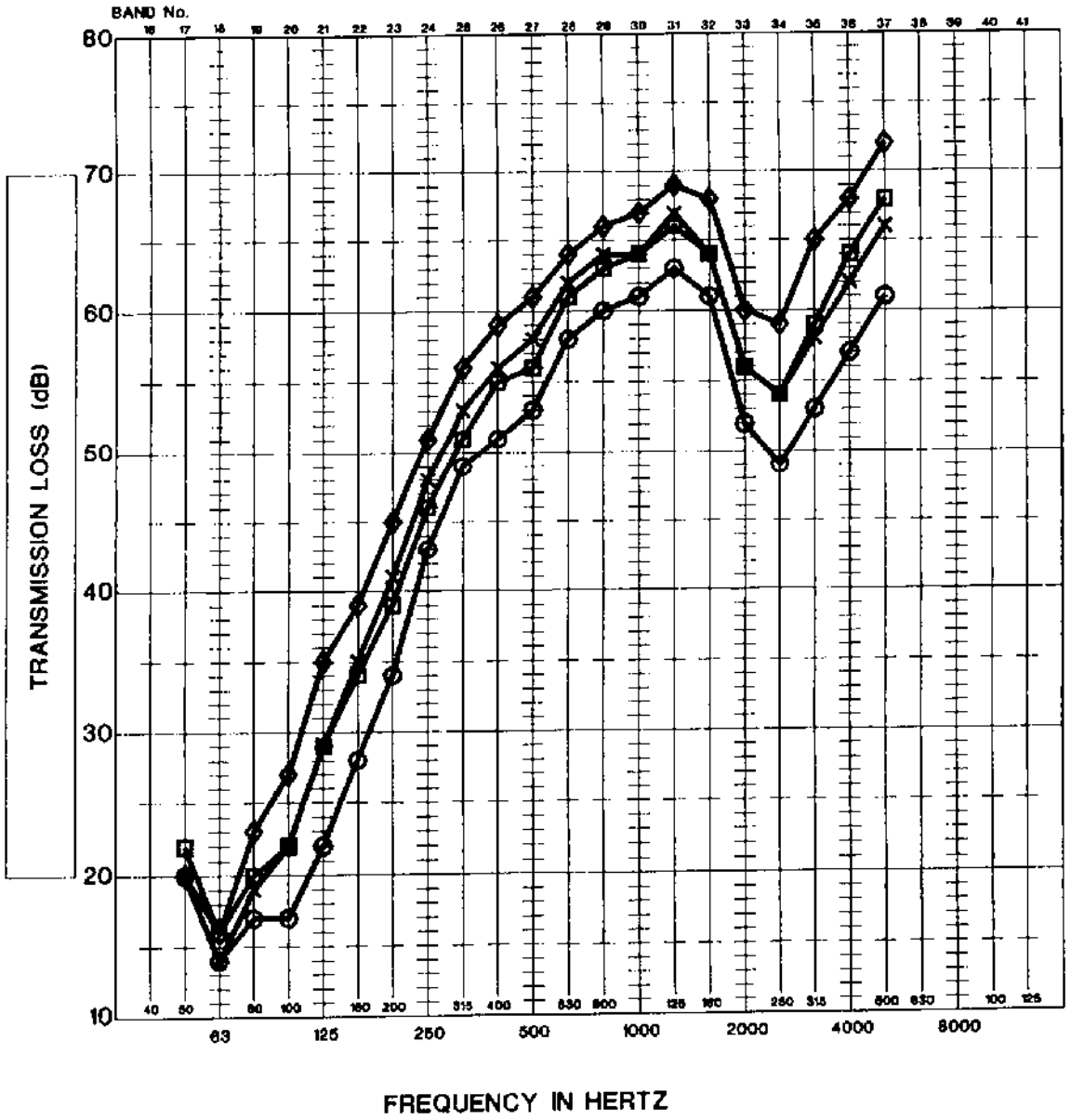
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM

GRAPH NUMBER 27	**FILE NAME:** 177GRA027
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF WOOD STUDS @ 406mm
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610mm
16 mm TYPE 'X' GYPSUM: 11.1 kg/m²

STC 59

2G16_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-115)

STC 53

G16_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-114)

STC 53

2G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-116)

STC 46

G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-113)

PROJECT DESCRIPTION

NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

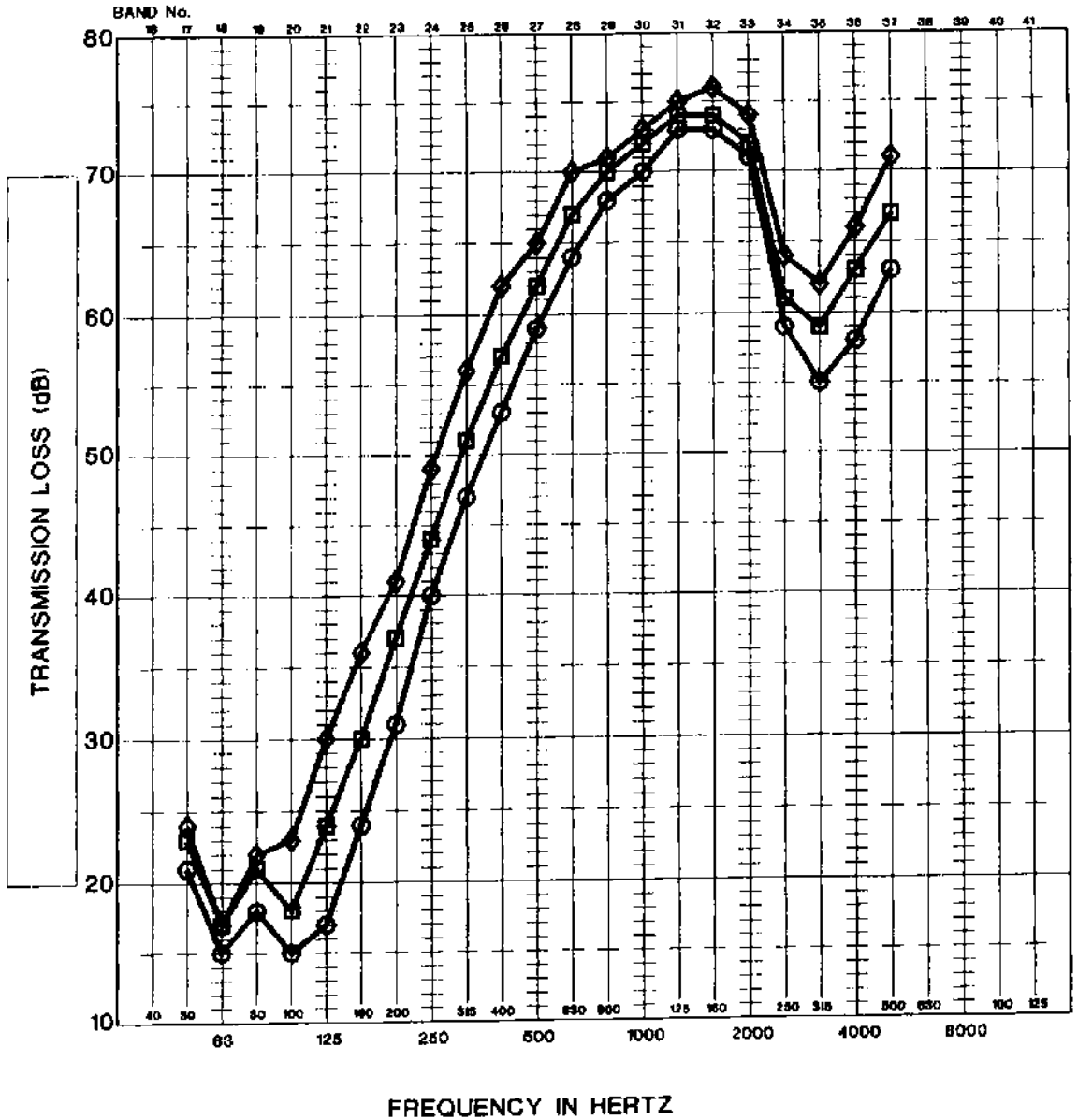
GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 28	**FILE NAME** 177GRA028
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

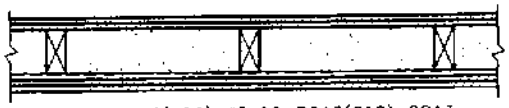
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

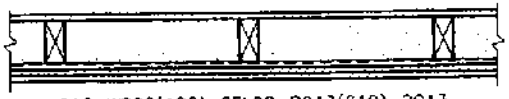
SINGLE ROW OF WOOD STUDS @ 406mm
BLOWN-IN CELLULOSE (C2)
RESILIENT CHANNELS @ 610mm
13mm TYPE 'X' GYPSUM BOARDS 10.0 kg/m²

STC 54



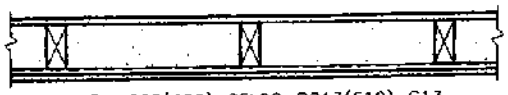
2G13_WS90(406)_CFL90_RC13(610)_2G13
(TL-93-173)

STC 48



G13_WS90(406)_CFL90_RC13(610)_2G13
(TL-93-172)

STC 41



G13_WS90(406)_CFL90_RC13(610)_G13
(TL-93-171)

PROJECT DESCRIPTION

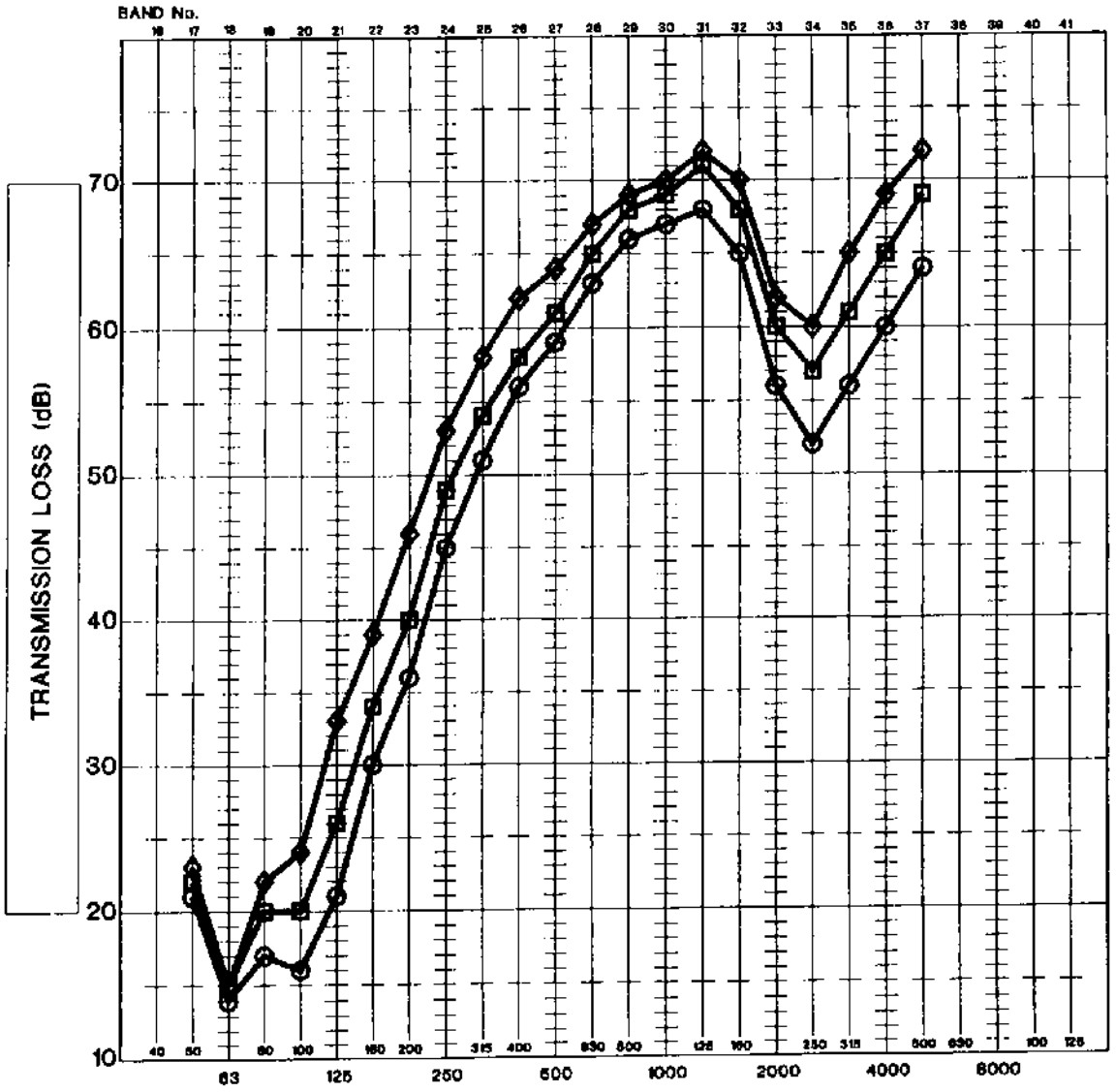
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 29	**FILE NAME:** 177GRA029
PROJECT NUMBER 177 011	**DATE** 2001 12

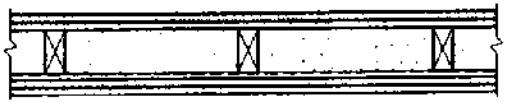
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

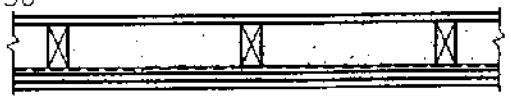
SINGLE ROW OF WOOD STUDS @ 406mm
BLOWN CELLULOSE (C2)
RESILIENT CHANNELS @ 610mm
16mm TYPE 'X' GYPSUM BOARDS: 11.0 kg/m²

STC 57



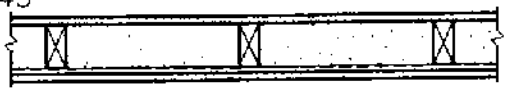
2G16_WS90(406)_CFL90_RC13(610)_2G16
(TL-93-108)

STC 50



G16_WS90(406)_CFL90_RC13(610)_2G16
(TL-93-107)

STC 45



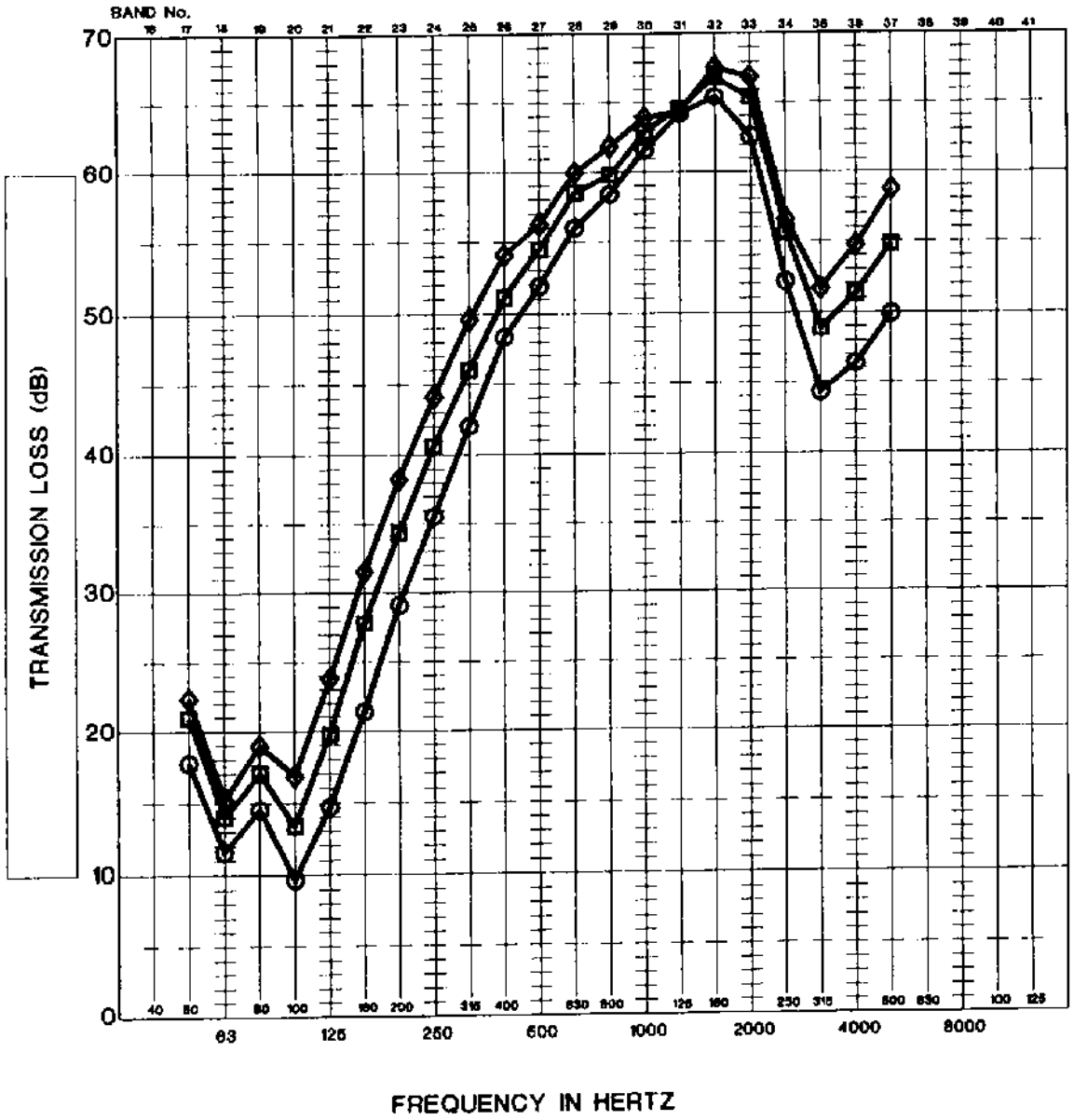
G16_WS90(406)_CFL90_RC13(610)_G16
(TL-93-105)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 30	**FILE NAME** 177GRA030
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
13 mm LIGHT WEIGHT GYPSUM BOARDS 7.31 kg/m²

STC 48

2G13_SS90(406)_GFB90_2G13
(TL-93-363)

STC 44

G13_SS90(406)_GFB90_2G13
(TL-93-364)

STC 39

G13_SS90(406)_GFB90_G13
(TL-93-361)

PROJECT DESCRIPTION

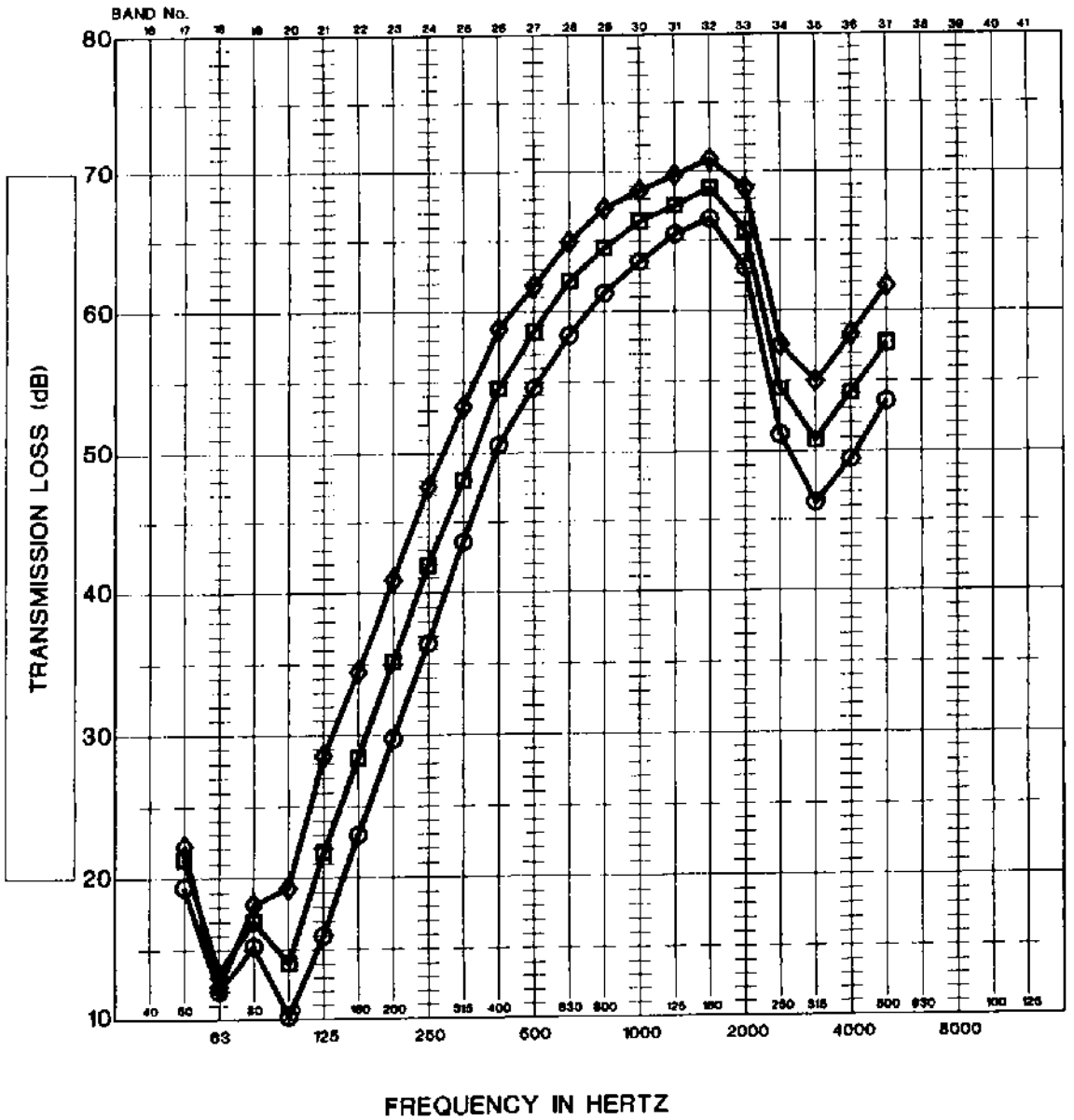
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 31	**FILE NAME:** 177GRA031
PROJECT NUMBER 177011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
13mm GYPSUM BOARDS 7.97 kg/m²

STC 53

2G13_SS90(406)_GFB90_2G13
(TL-93-367)

STC 46

G13_SS90(406)_GFB90_2G13
(TL-93-366)

STC 40

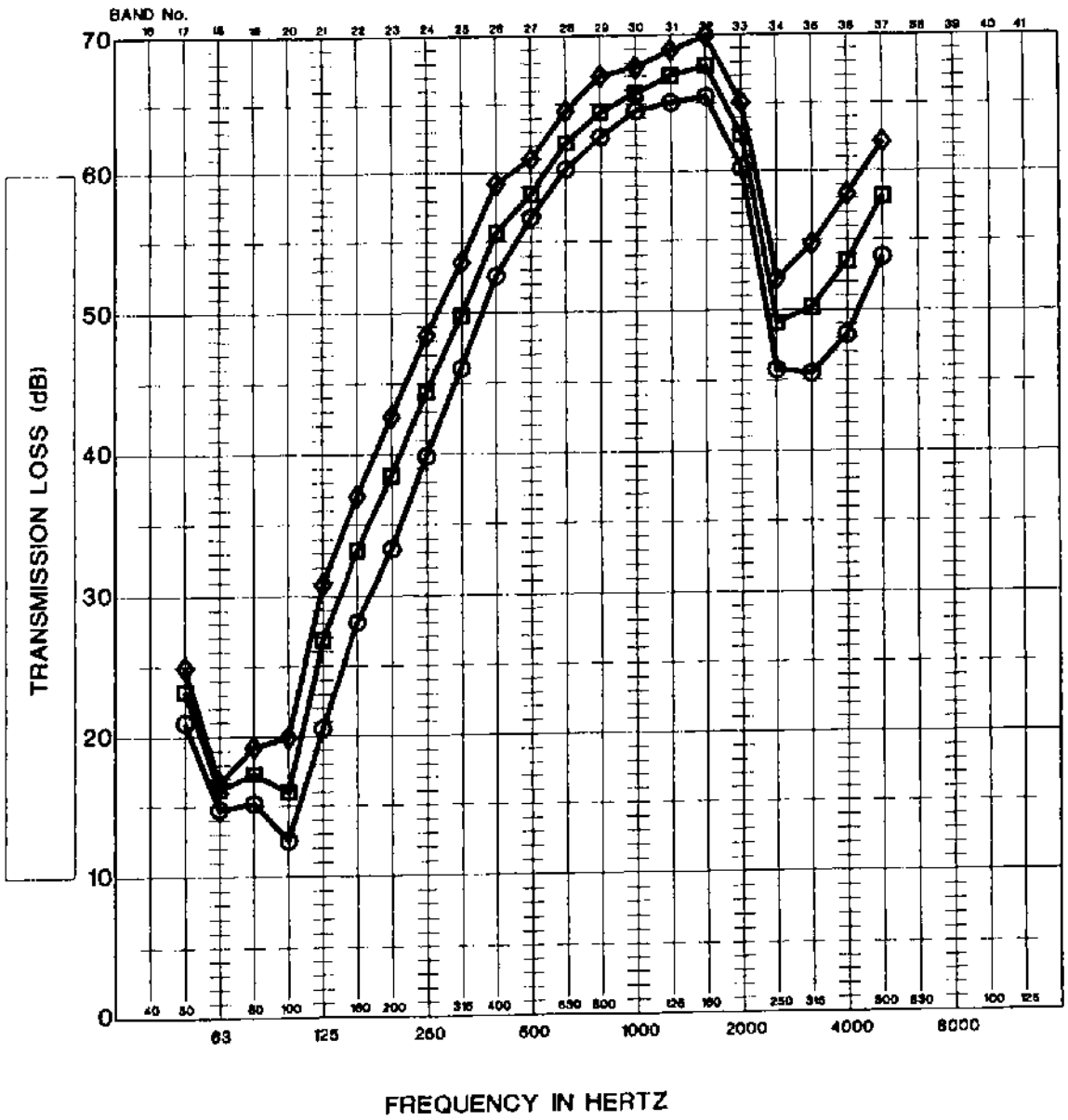
G13_SS90(406)_GFB90_0G13
(TL-93-365)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 32	**FILE NAME** 177GRA032
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



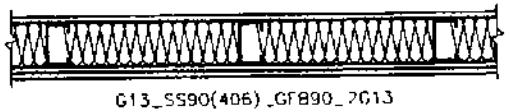
LEGEND

SINGLE ROW OF STEEL STUDS @ 406mm
GLASS FIBRE INSULATION (G1)
13mm TYPE 'X' GYPSUM BOARDS 10 kg/m²

STC 55

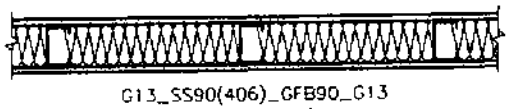
2G13_SS90(406)_GFB90_2G13
(TL-92-424)

STC 51



G13_SS90(406)_GFB90_2G13
(TL-92-423)

STC 45



G13_SS90(406)_GFB90_G13
(TL-92-422)

PROJECT DESCRIPTION

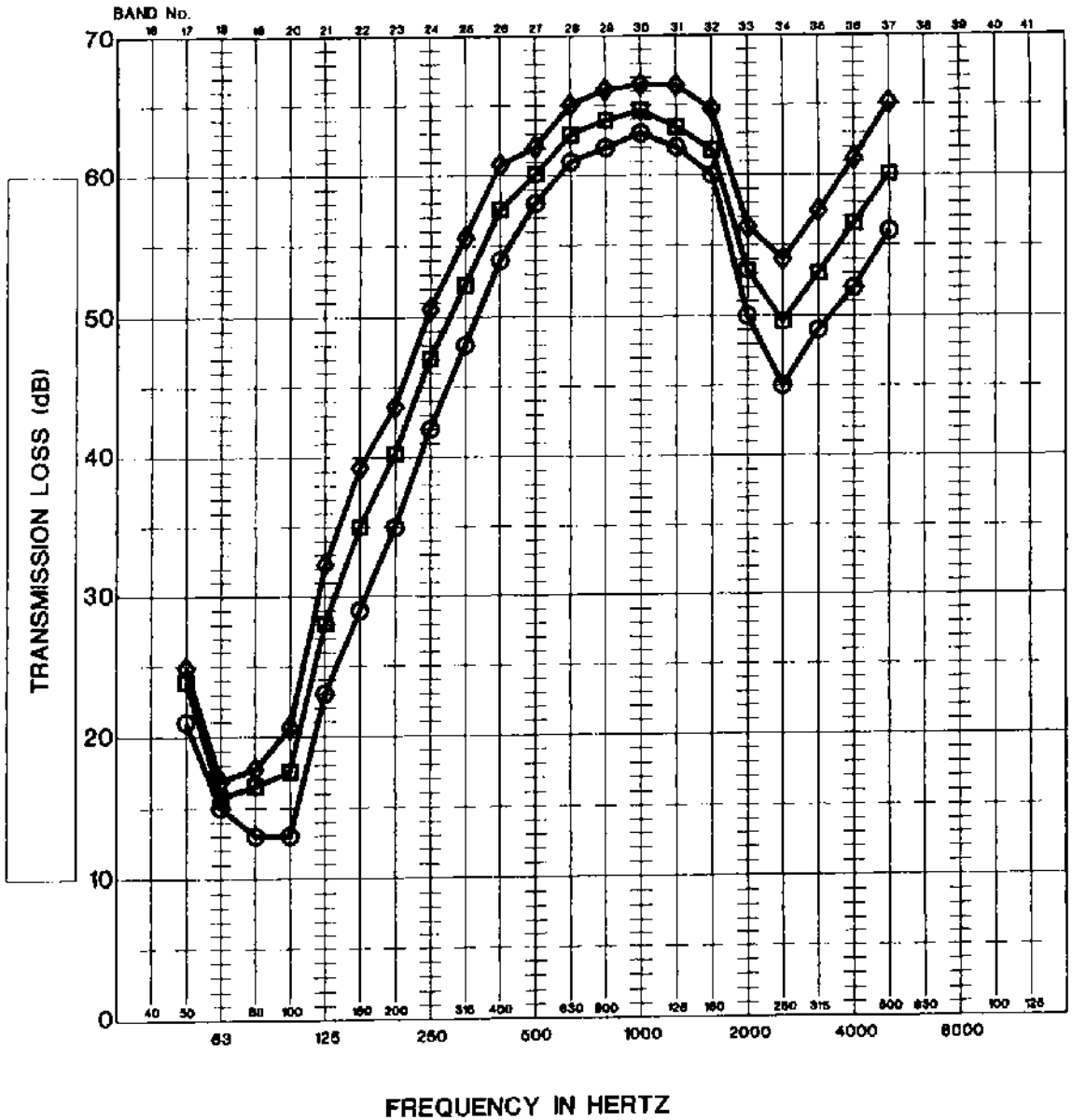
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 33	**FILE NAME** 177GRA033
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 406mm
GLASS FIBRE INSULATION (G1)
16mm TYPE 'X' GYPSUM
BOARDS 10 86 kg/m²

STC 56

2G16_SS90(406)_GFB90_2G16
(TL-92-421)

STC 52

G16_SS90(406)_GFB90_2G16
(TL-92-420)

STC 47

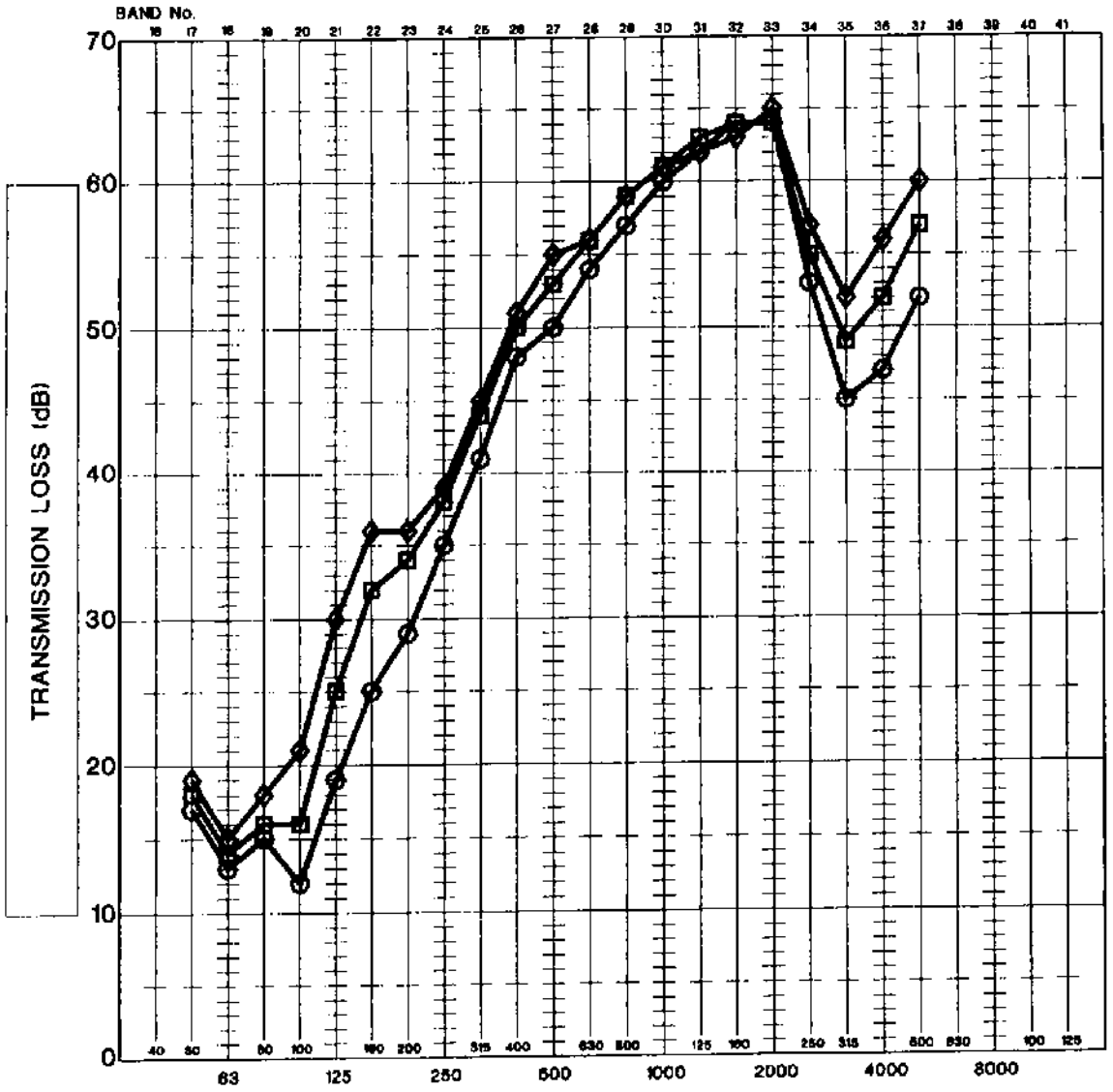
G16_SS90(406)_GFB90_G16
(TL-92-419)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 33B	**FILE NAME:** 177GRA33B
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
13 mm GYPSUM: 8.3 kg/m^2

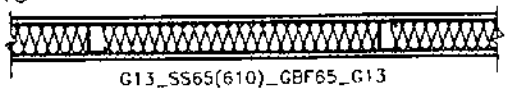
STC 52

2G13_SS65(610)_GFB65_2G13
(TL-93-046)

STC 49

G13_SS65(610)_GFB65_2G13
(TL-93-045)

STC 43



G13_SS65(610)_GBF65_G13
(TL-93-044)

PROJECT DESCRIPTION

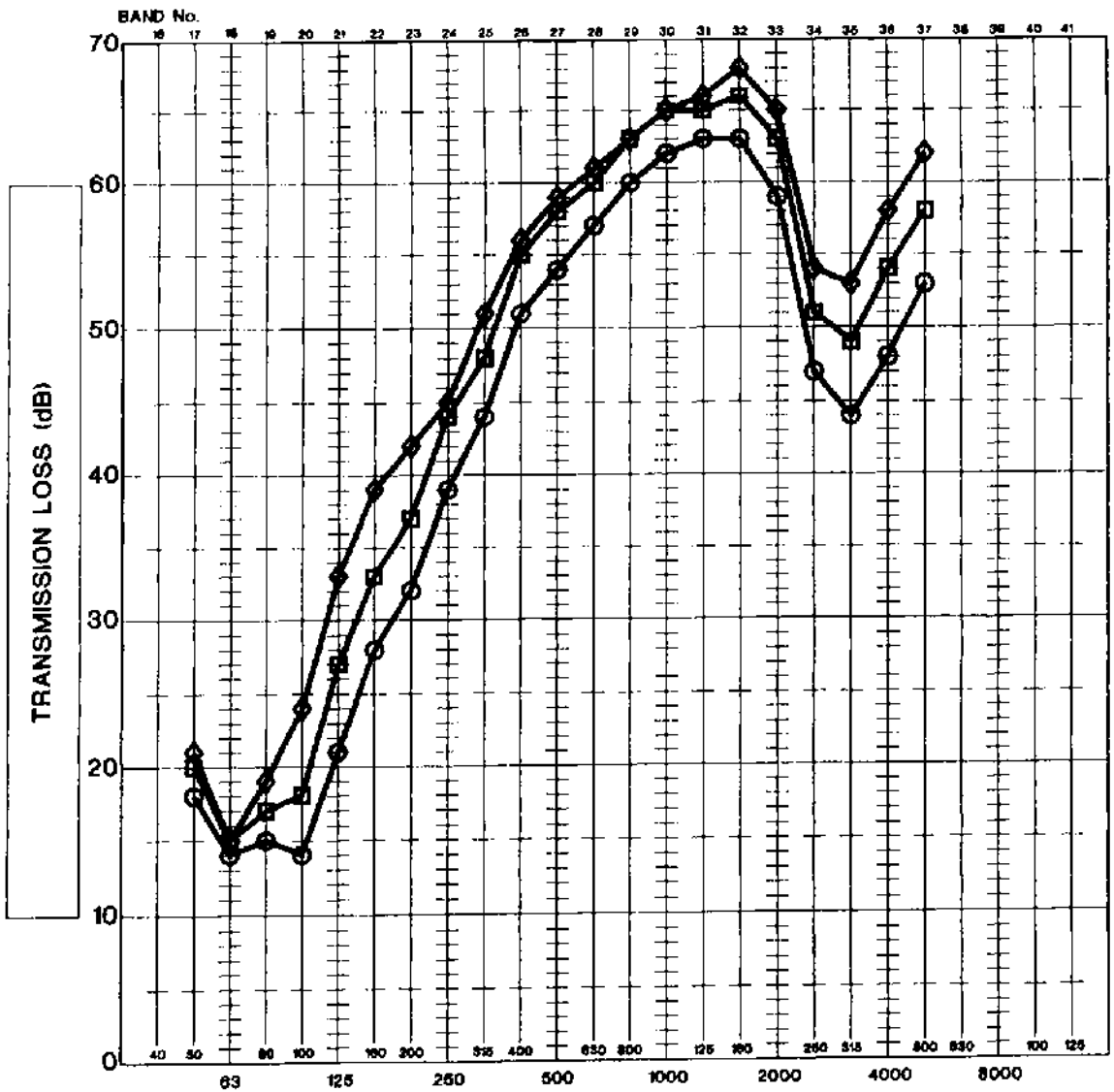
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 34	**FILE NAME:** 177GRA034
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
13 mm TYPE 'X' GYPSUM: 10.0 kg/m²

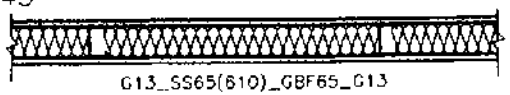
STC 55

2G13_SS65(610)_GFB65_2G13
(TL-93-040)

STC 51

G13_SS65(610)_GFB65_2G13
(TL-93-039)

STC 45



G13_SS65(610)_GBF65_G13
(TL-93-038)

PROJECT DESCRIPTION

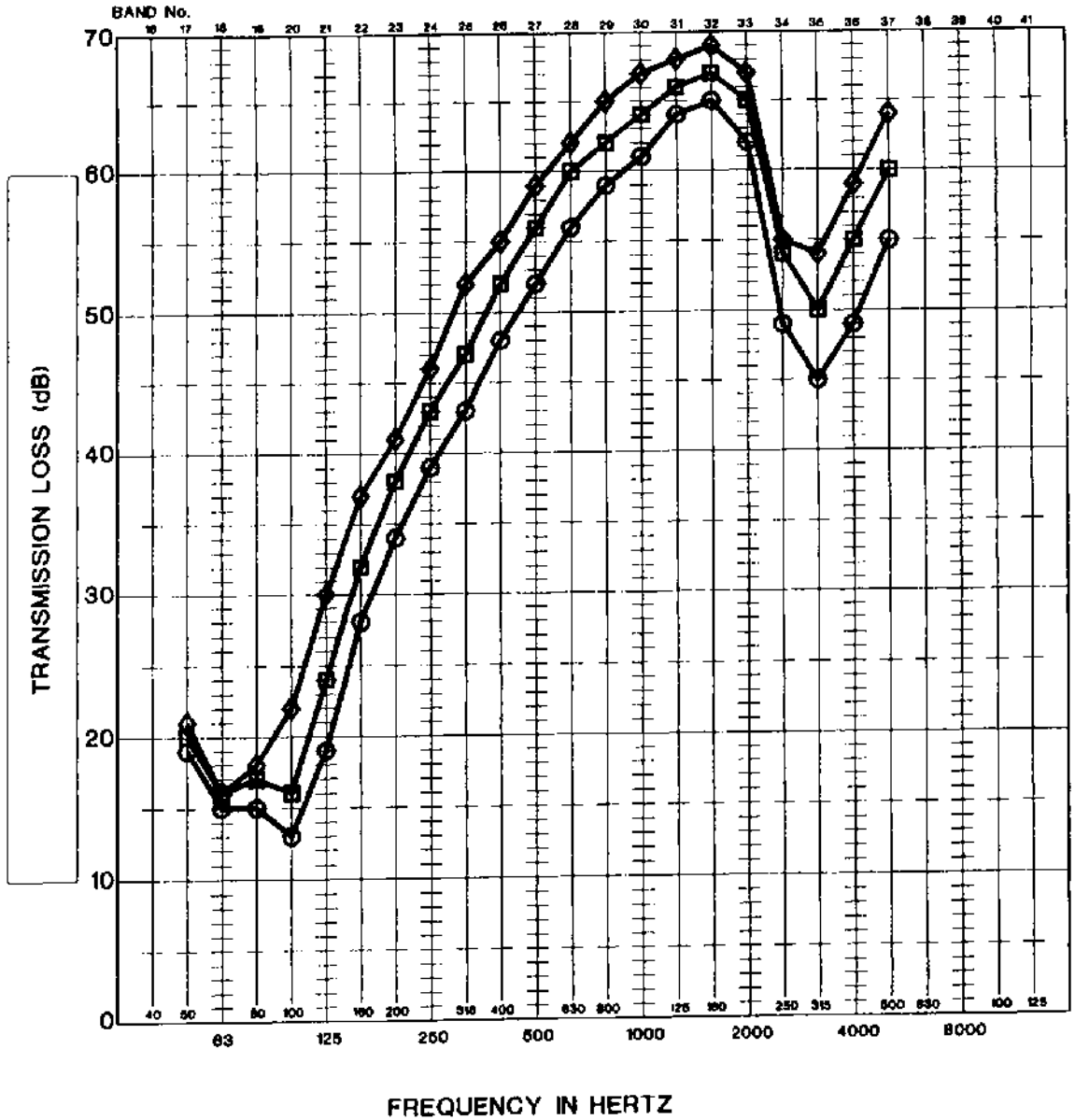
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 35	**FILE NAME:** 177GRA035
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 610 mm
MINERAL FIBER INSULATION (M1)
13 mm TYPE 'X' GYPSUM: 10.0 kg/m²

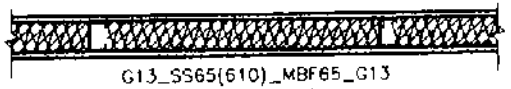
STC 54

2G13_SS65(610)_MFB65_2G13
(TL-93-056)

STC 48

G13_SS65(610)_MFB65_2G13
(TL-93-048)

STC 43



G13_SS65(610)_MBF65_G13
(TL-93-047)

PROJECT DESCRIPTION

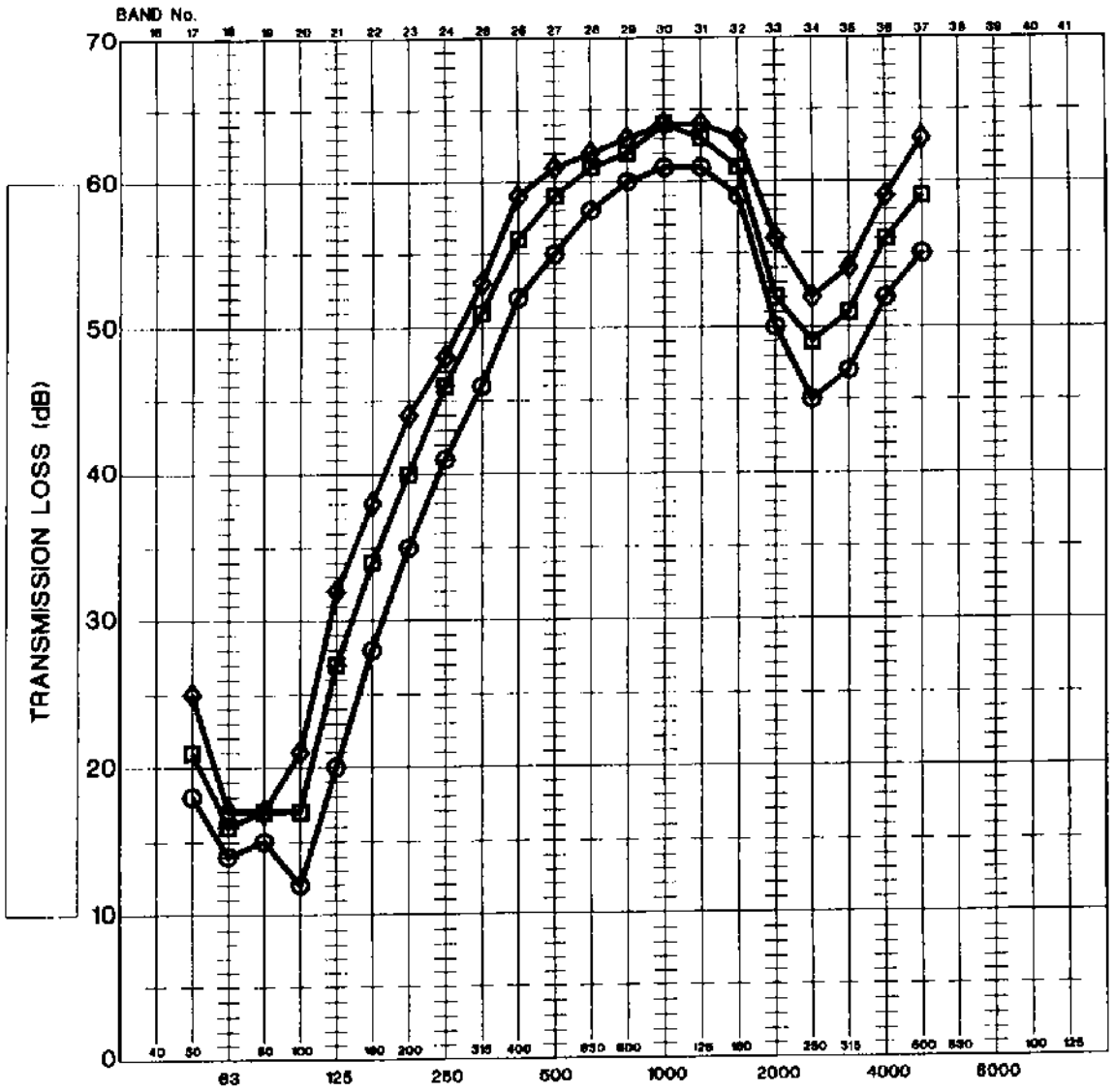
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 36	**FILE NAME** 177GRA036
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' BOARDS 11.0 kg/m²

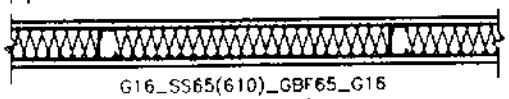
STC 55

2G16_SS65(610)_GFB65_2G16
(TL-93-037)

STC 51

G16_SS65(610)_GFB65_2G16
(TL-93-036)

STC 44



G16_SS65(610)_GBF65_G16
(TL-93-033)

PROJECT DESCRIPTION

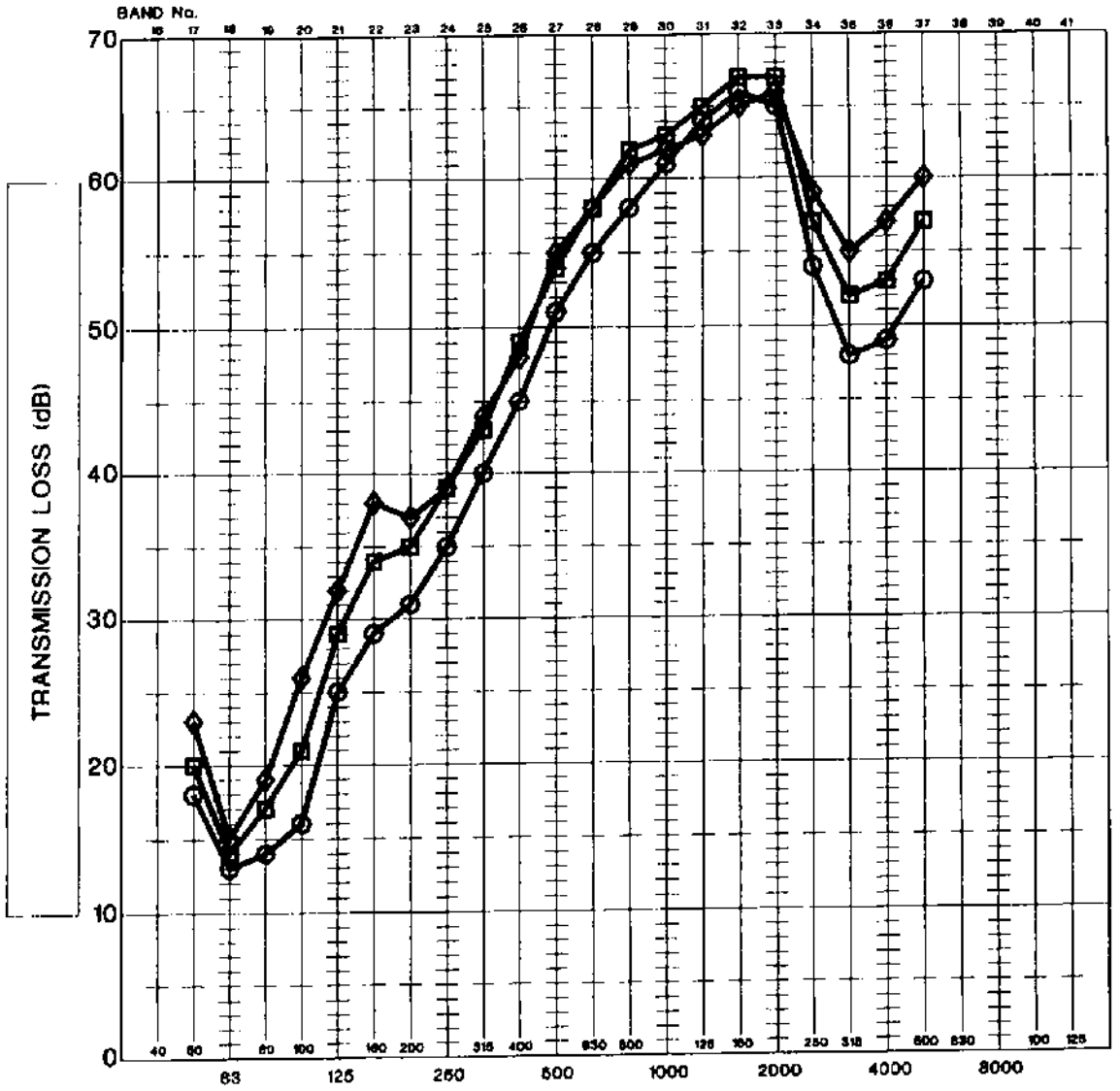
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 37	**FILE NAME** 177GRA037
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE : THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



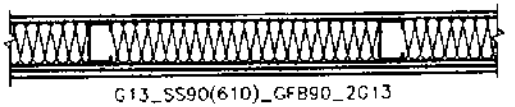
LEGEND

SINGLE ROW OF STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
13 mm GYPSUM 8.2 kg/m²

STC 53

2G13_SS90(610)_GFB90_2G13
(TL-92-416)

STC 51



G13_SS90(610)_GFB90_2G13
(TL-92-415)

STC 47

G13_SS90(610)_GFB90_G13
(TL-92-413)

PROJECT DESCRIPTION

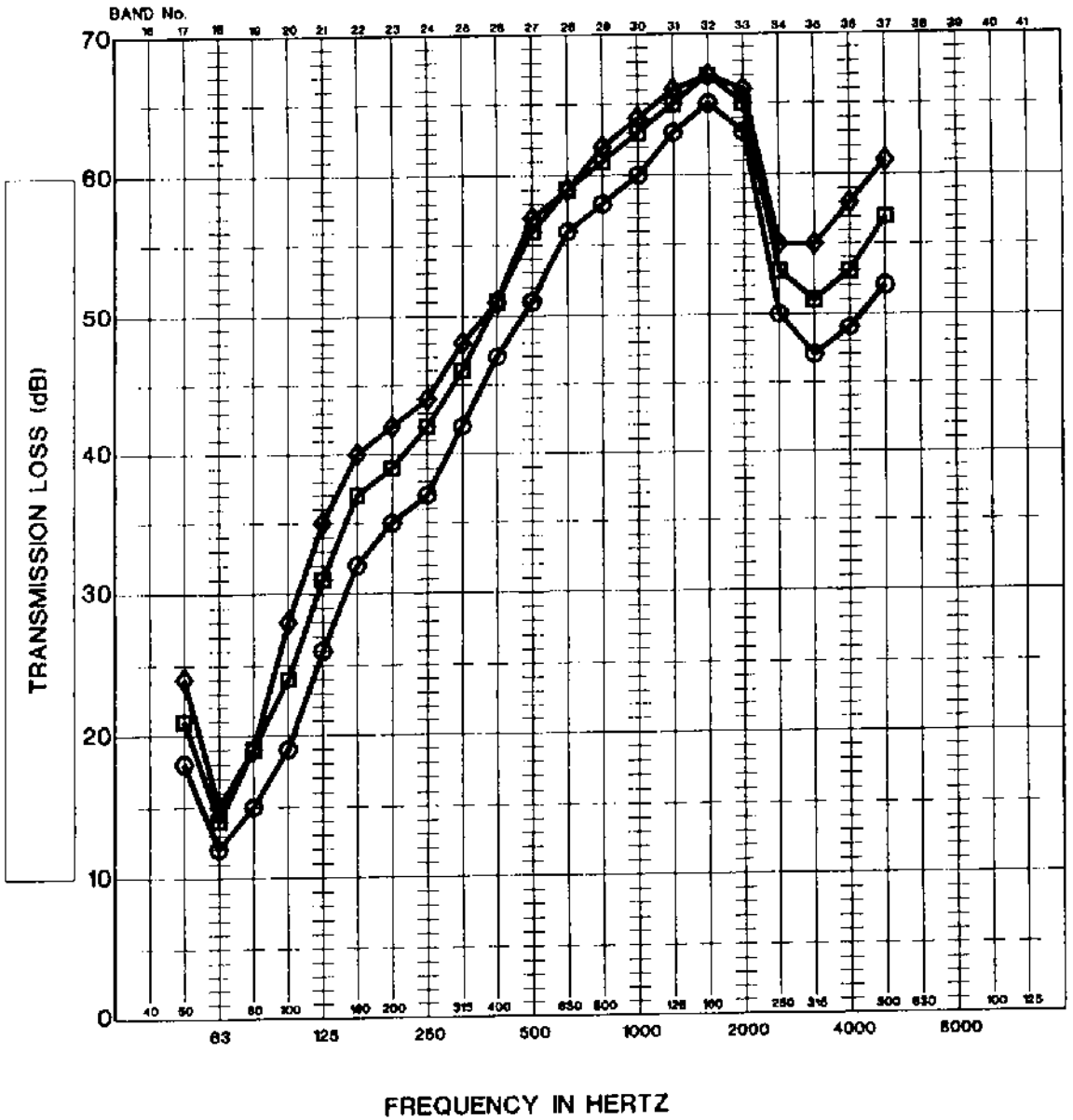
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 38	**FILE NAME:** 177GRA038
PROJECT NUMBER 177.011	**DATE** 2001 12

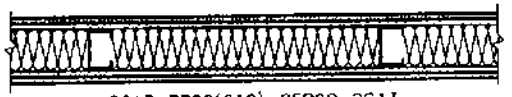
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
13 mm TYPE 'X' GYPSUM: 9.9 kg/m²

STC 55

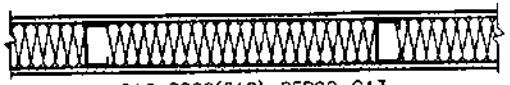


2G13_SS90(610)_GFB90_2G13
(TL-92-412)

STC 52

G13_SS90(610)_GFB90_2G13
(TL-92-411)

STC 48



G13_SS90(610)_GFB90_G13
(TL-92-410)

PROJECT DESCRIPTION

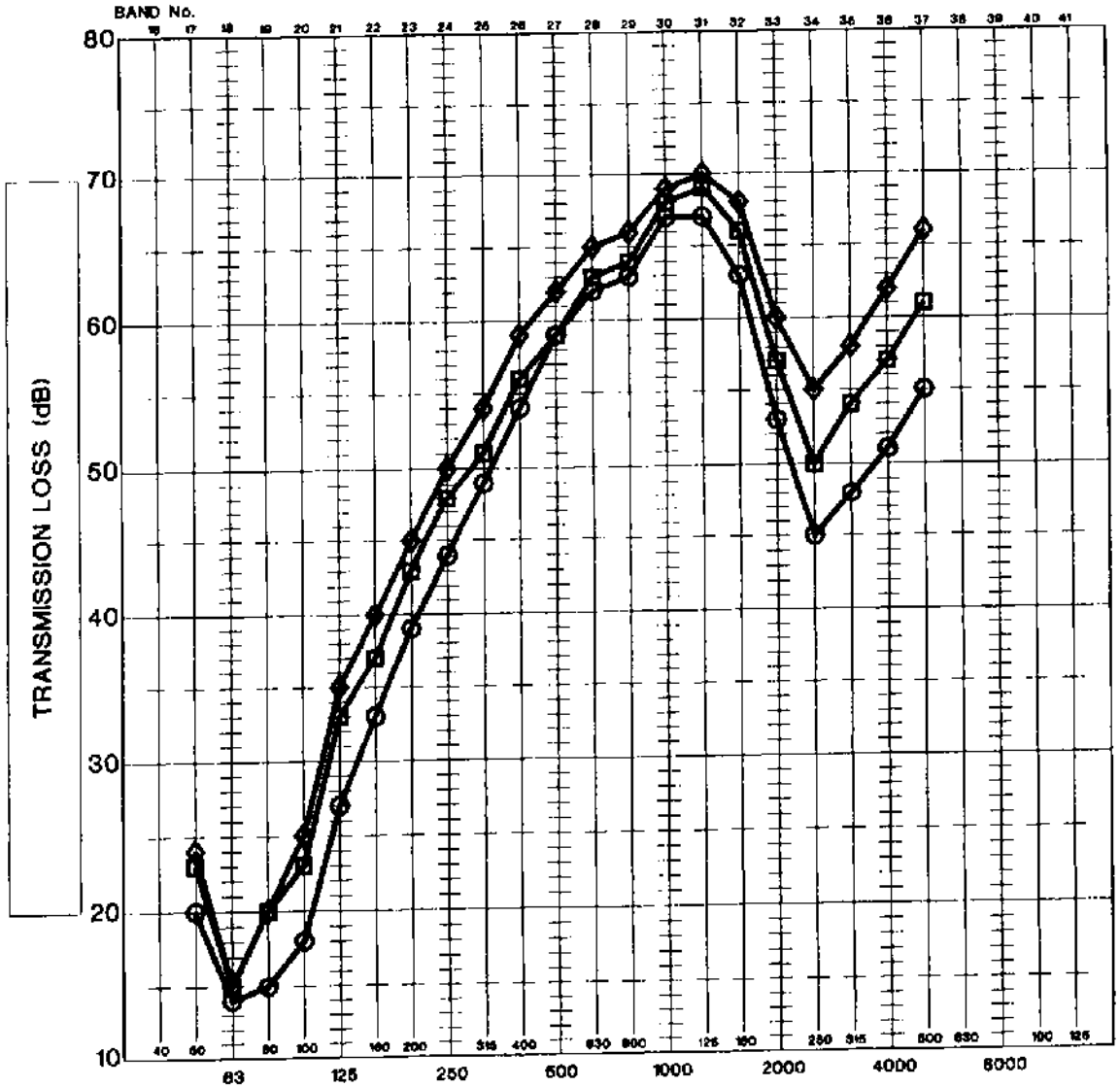
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 39	**FILE NAME** 177GRA039
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

SINGLE ROW OF STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM: 11.1 kg/m²

STC 58

2G16_SS90(610)_GFB90_2G16
(TL-92-369)

STC 54

G16_SS90(610)_GFB90_2G16
(TL-92-368)

STC 49

G16_SS90(610)_GFB90_G16
(TL-92-367)

PROJECT DESCRIPTION

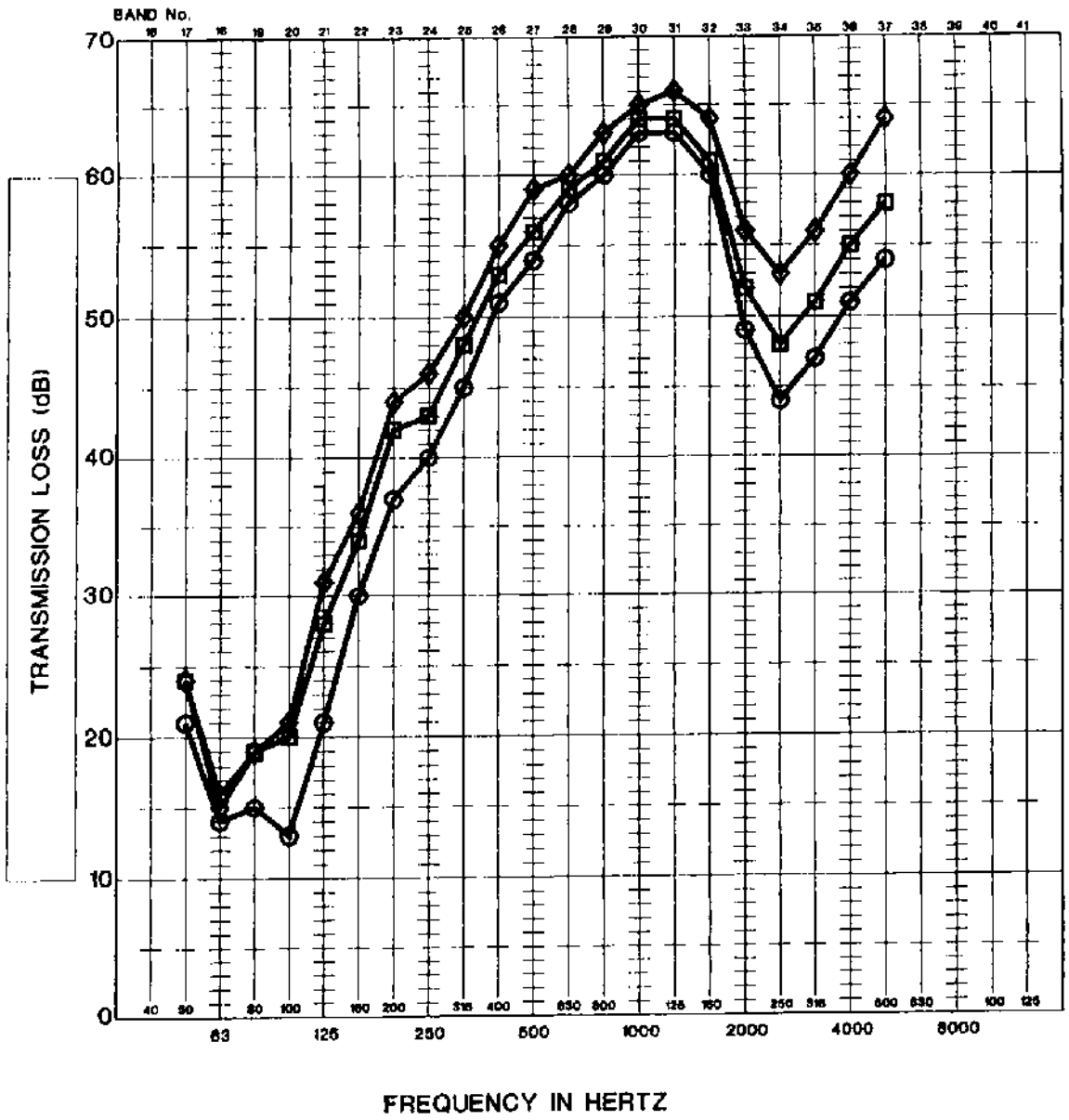
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 40	**FILE NAME** 177GRA040
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



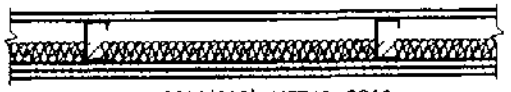
LEGEND

SINGLE ROW OF STEEL STUDS @ 610 mm
MINERAL FIBER INSULATION (M2)
16 mm TYPE 'X' GYPSUM: 10.9 kg/m^2

STC 55

2G16_SS90(610)_MFB40_2G16
(TL-92-398)

SIC 51



G16_SS90(610)_MFB40_2G16
(TL-92-397)

STC 45

G16_SS90(610)_MFB40_G16
(TL-92-396)

PROJECT DESCRIPTION

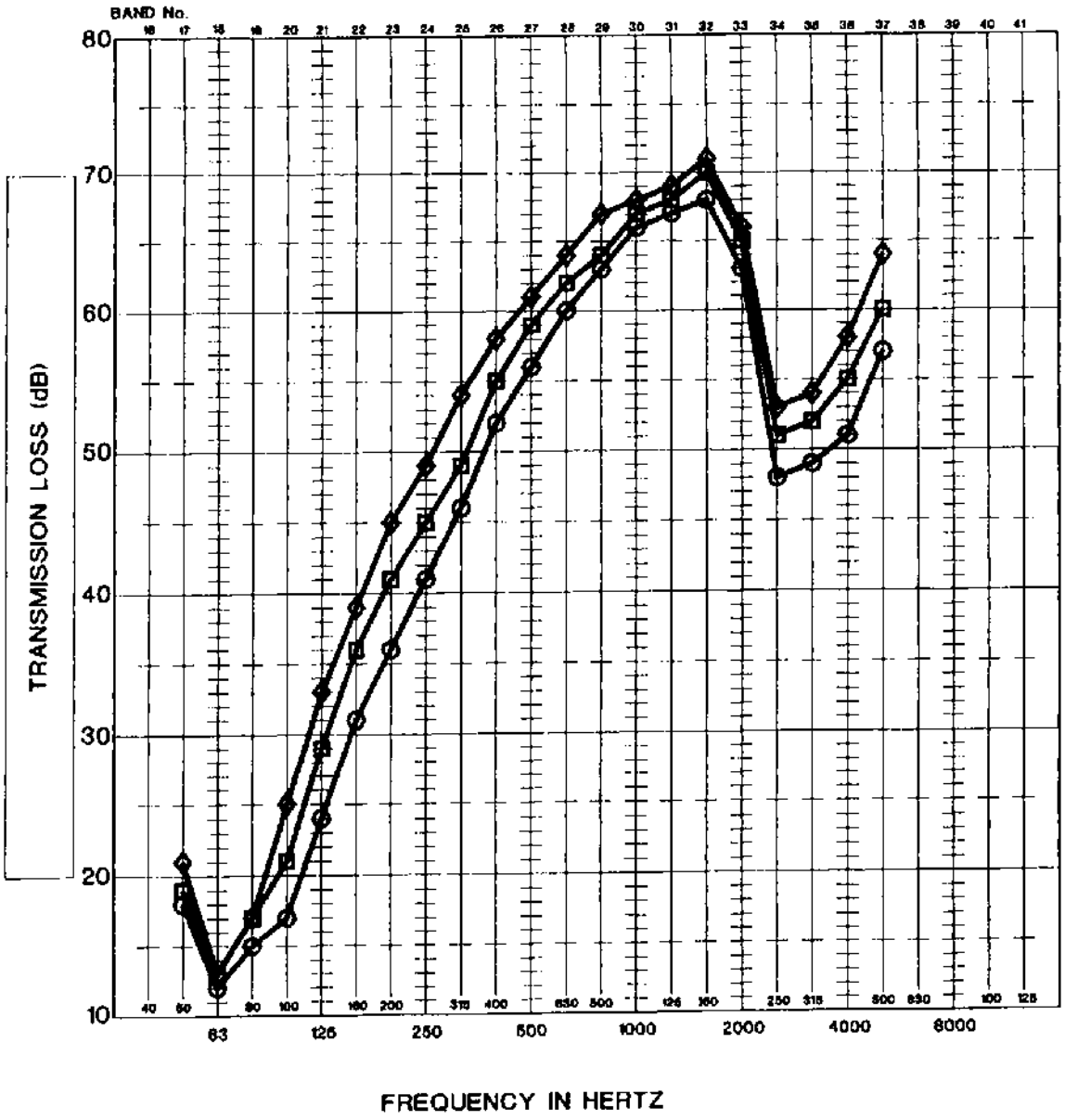
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 41	**FILE NAME:** 177GRA041
PROJECT NUMBER 177 011	**DATE** 2001 12

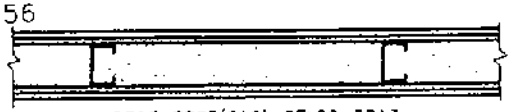
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

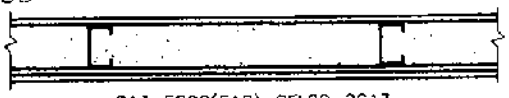
SINGLE ROW OF STEEL STUDS @ 610 mm
BLOWN-IN CELLULOSE (C2)
13 mm TYPE 'X' GYPSUM: 10.0 kg/m²

STC 56



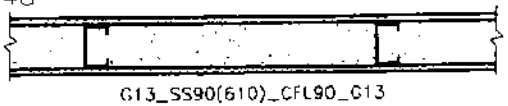
2G13_SS90(610)_CFL90_2G13
(TL-93-028)

STC 53



G13_SS90(610)_CFL90_2G13
(TL-93-027)

STC 48



G13_SS90(610)_CFL90_G13
(TL-93-026)

PROJECT DESCRIPTION

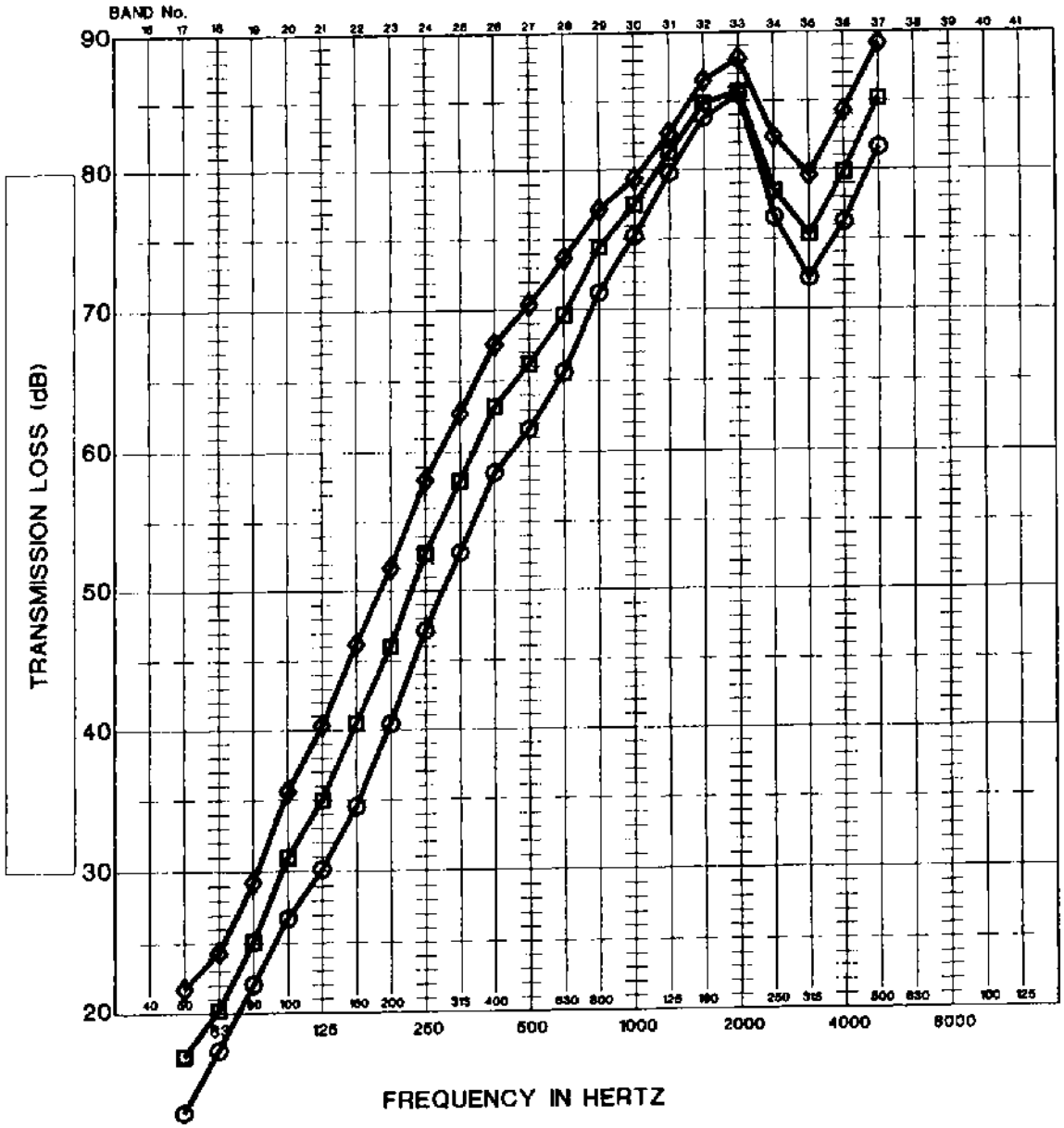
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 42	**FILE NAME:** 177GRA042
PROJECT NUMBER 177 011	**DATE** 2001 12

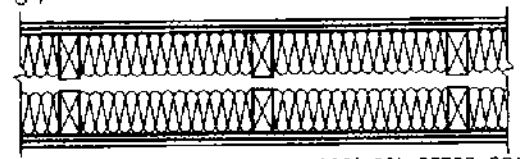
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

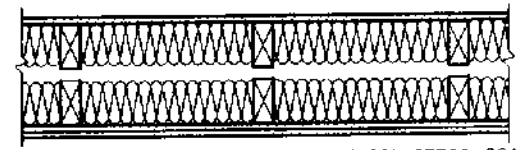
DOUBLE ROW OF WOOD STUDS @ 406mm
GLASS FIBER INSULATION (G1)
13mm GYPSUM BOARDS · 8.36 kg/m²

STC 64



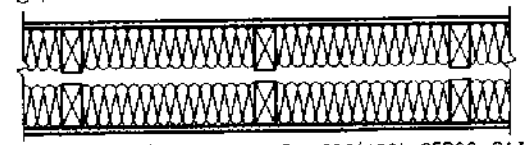
2G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_2G13
(TL-93-275)

STC 59



G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_2G13
(TL-93-274)

STC 54



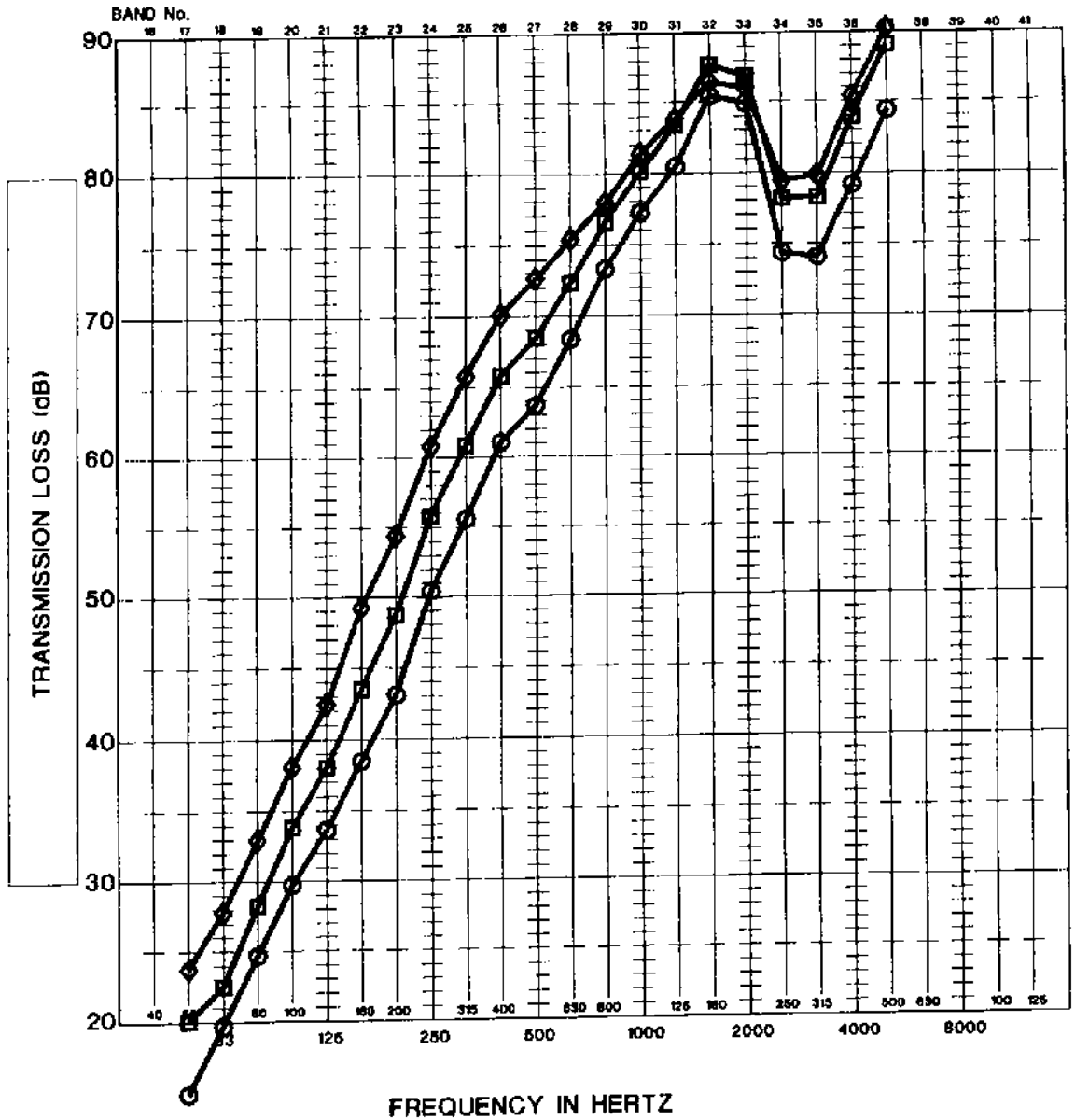
G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G13
(TL-93-273)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 43	**FILE NAME** 177GRA043
PROJECT NUMBER 177.011	**DATE** 2001 12

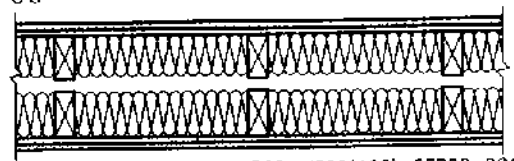
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

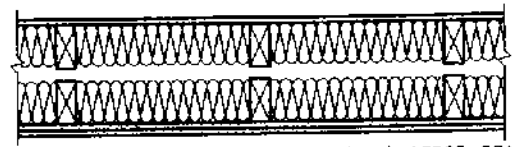
DOUBLE ROW OF WOOD STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
13mm TYPE 'X' GYPSUM
BOARDS 10 19 kg/m²

STC 66



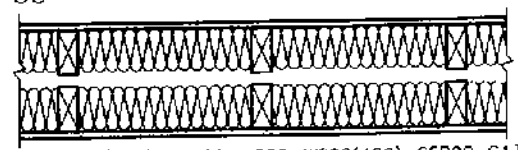
2G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_2G13
(TL-93-272)

STC 62



G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_2G13
(TL-93-271)

STC 58



G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G13
(TL-93-270)

PROJECT DESCRIPTION

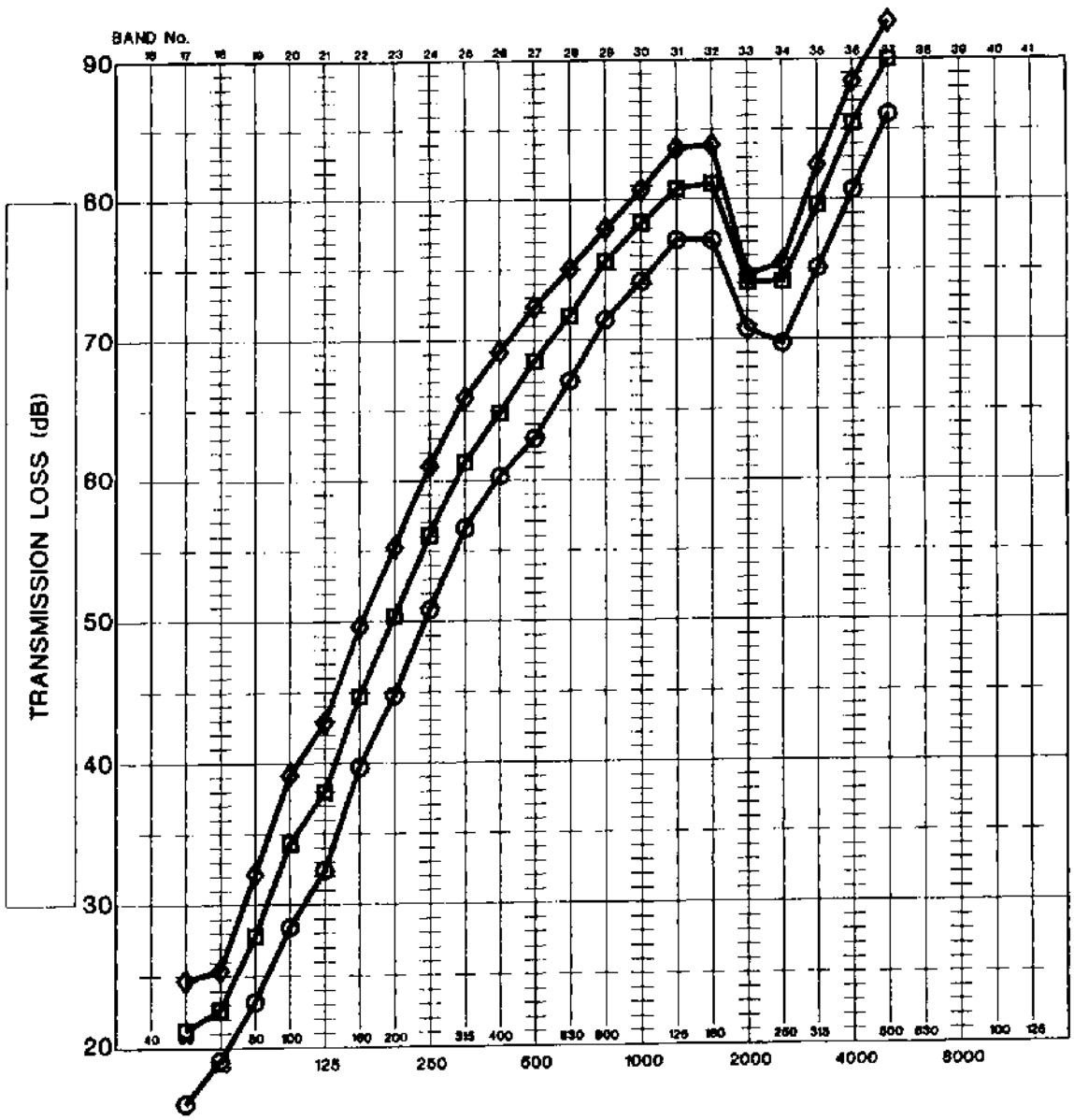
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 44	**FILE NAME** 177GRA044
PROJECT NUMBER 177 011	**DATE** 2001 12

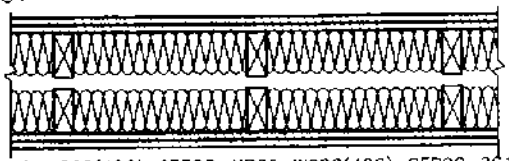
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

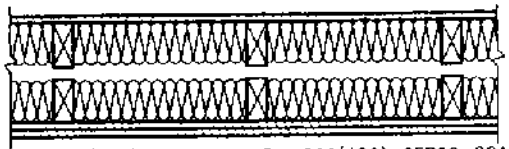
DOUBLE ROW OF WOOD STUDS @ 406mm
GLASS FIBER INSULATION (G1)
16mm TYPE 'X' GYPSUM
BOARDS 11 52 kg/m²

STC 67



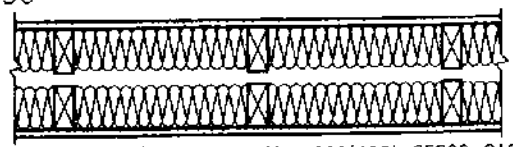
2G16_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_2G16
(TL-93-269)

STC 62



G16_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_2G16
(TL-93-267)

STC 56



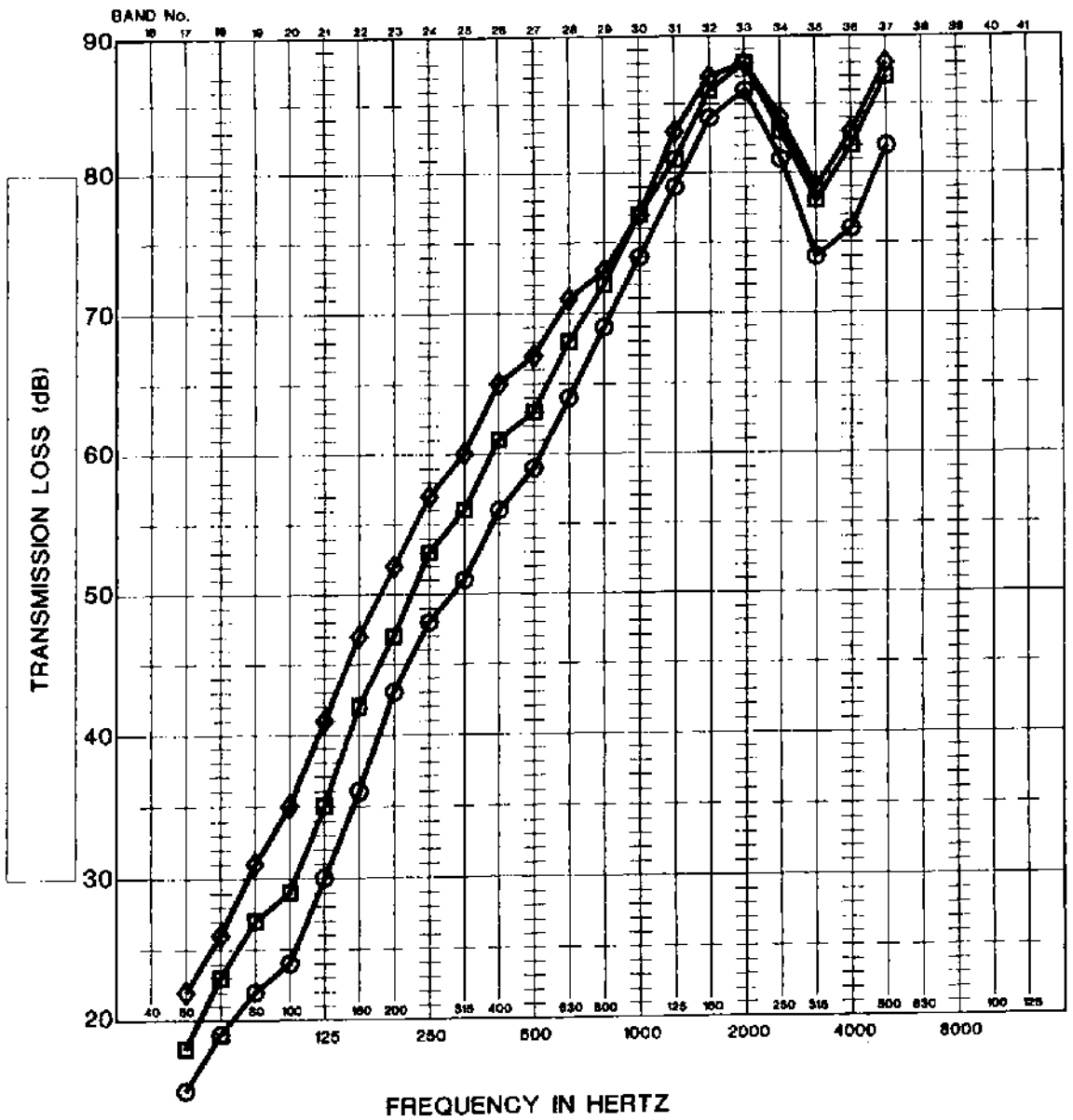
G16_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G16
(TL-93-266)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 45A	**FILE NAME** 177GRA45A
PROJECT NUMBER 177.011	**DATE** 2001 12

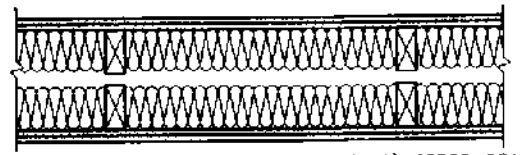
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

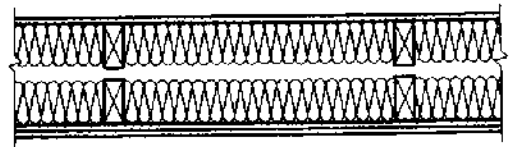
DOUBLE ROW OF WOOD STUDS @ 610mm
GLASS FIBER INSULATION (G1)
13 mm GYPSUM BOARDS 8.3 kg/m²

STC 65



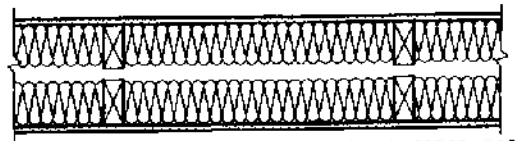
2G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_2G13
(TL-93-286)

STC 59



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_2G13
(TL-93-285)

STC 54



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-284)

PROJECT DESCRIPTION

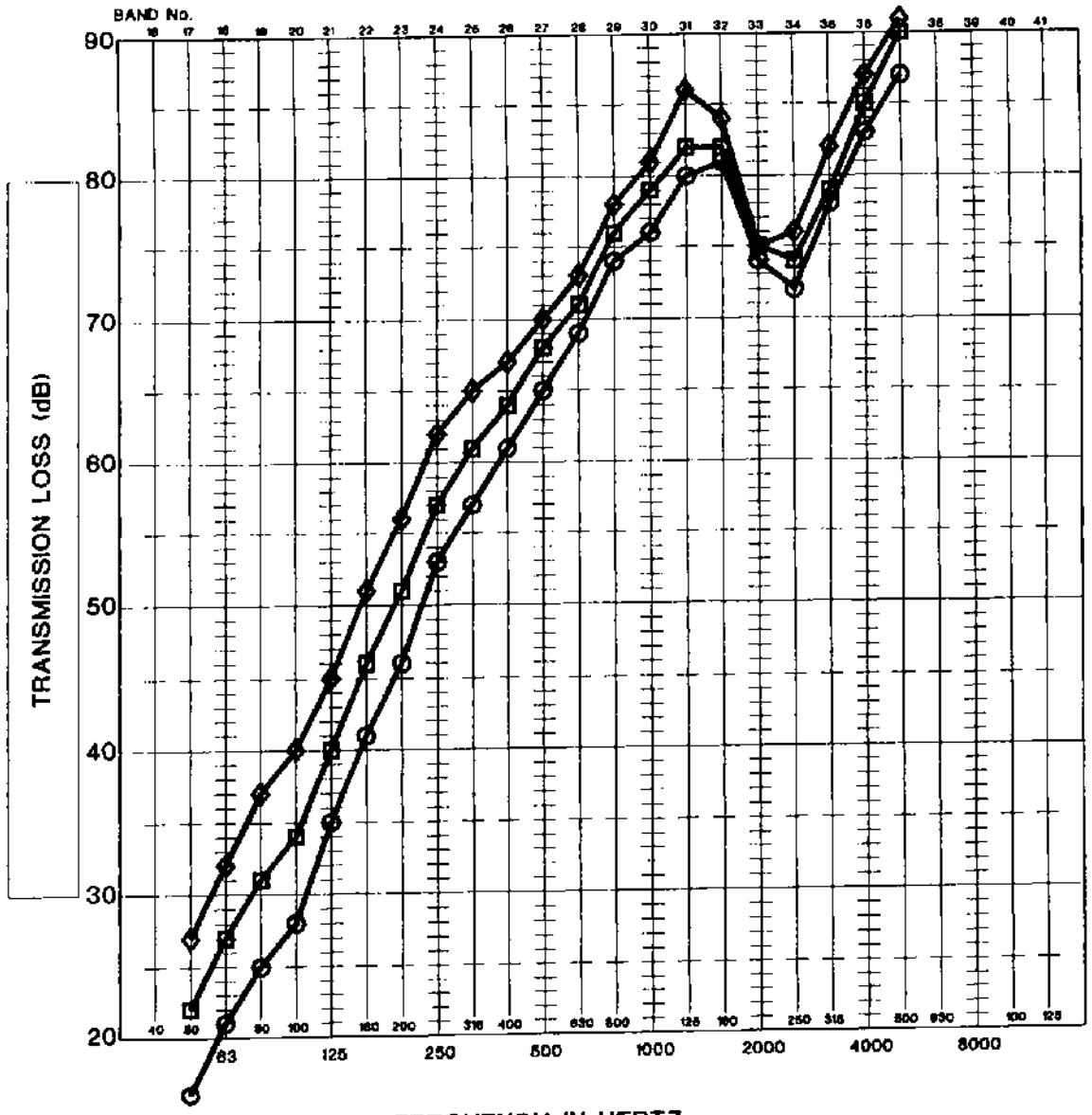
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 45B	**FILE NAME:** 177GRA45B
PROJECT NUMBER 177.011	**DATE** 2001 12

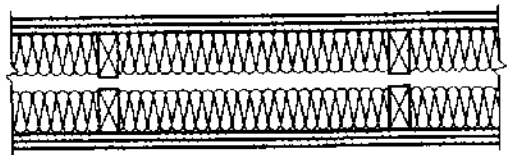
NOTE : THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

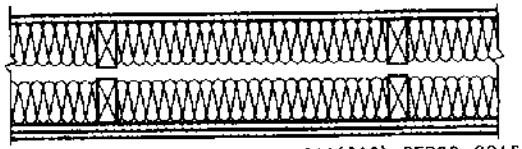
DOUBLE ROW OF WOOD STUDS @ 610 mm
GLASS FIBER INSULATION (G1)

STC 69



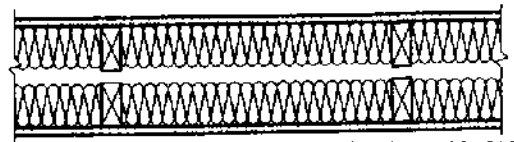
2G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_2G16
(TL-93-283)

STC 64



G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_2G16
(TL-83-282)

STC 59



G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G16
(TL-281)

PROJECT DESCRIPTION

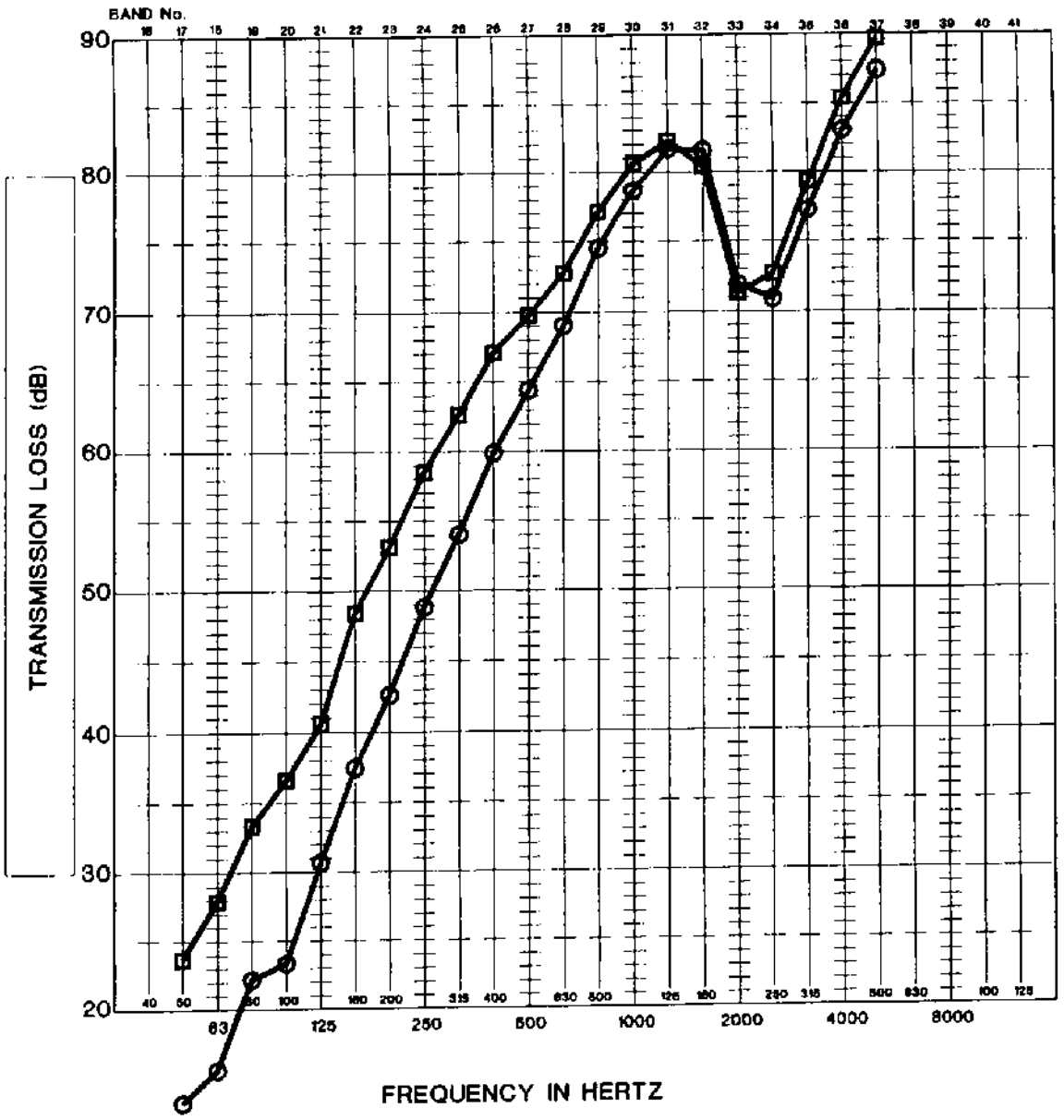
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 45C	**FILE NAME** 177GRA45C
PROJECT NUMBER 177.011	**DATE** 2001 12

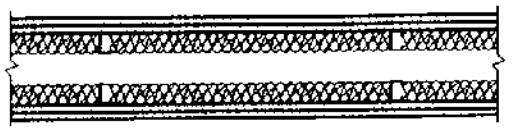
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

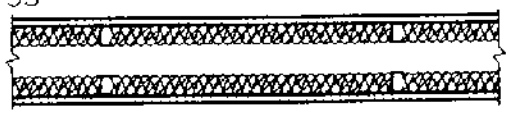
DOUBLE ROW OF 40mm STEEL STUDS @ 610 mm
NO GUSSETS BETWEEN ROWS OF STUDS 16mm TYPE 'X' GYPSUM BOARDS 11.49 kg/m^2
MINERAL FIBER INSULATION (M2)

STC 65



2G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_2G16
(TL-93-320)

STC 55



G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_G16
(TL-93-310)

PROJECT DESCRIPTION

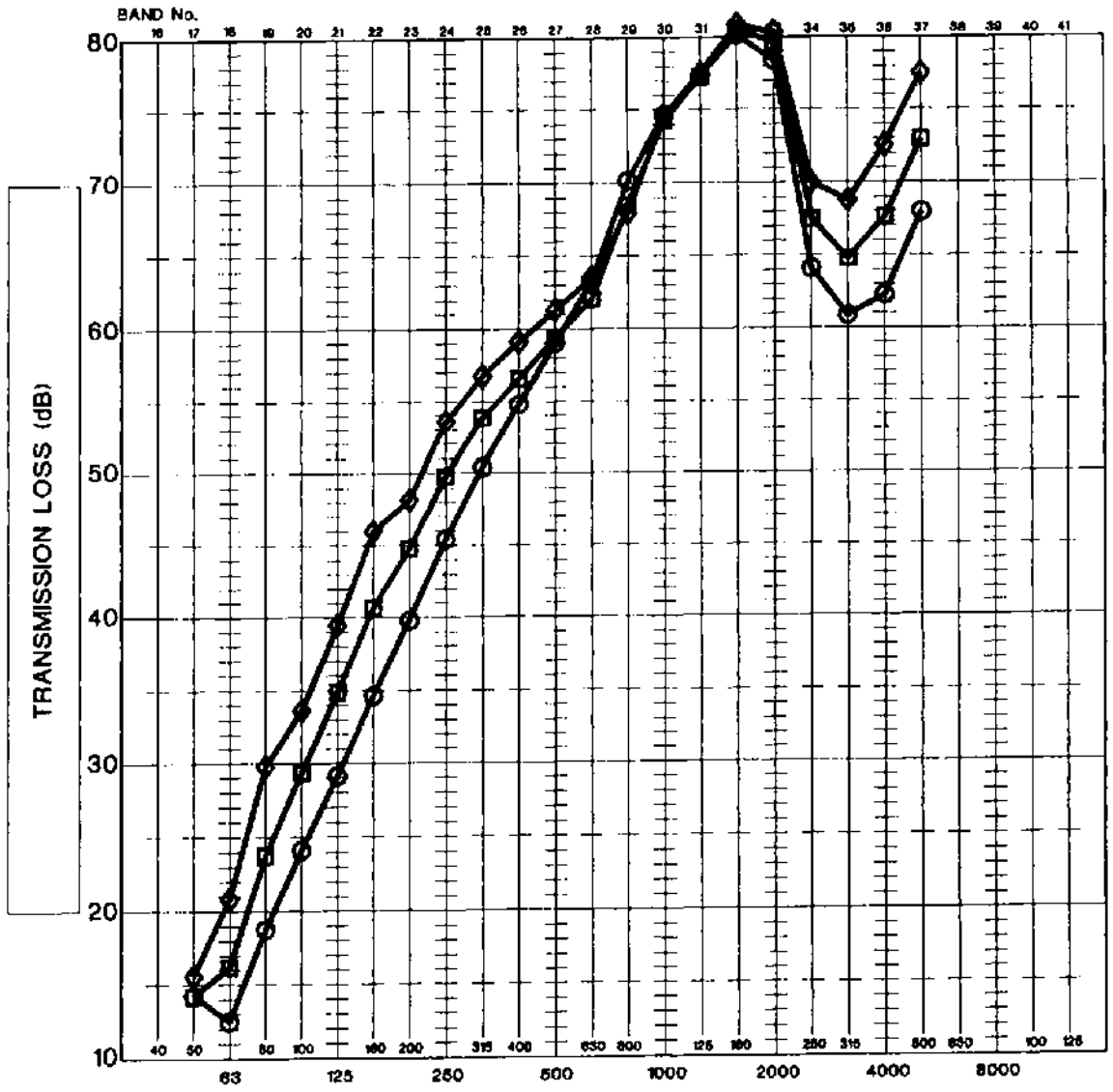
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 46	**FILE NAME** 177GRA046
PROJECT NUMBER 177.011	**DATE** 2001 12

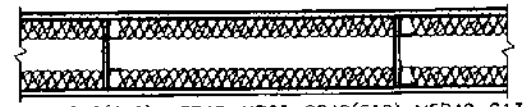
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

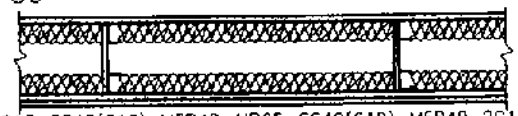
DOUBLE ROW OF 40mm STEEL STUDS @ 610mm
13 mm TYPE 'X' GYPSUM BOARDS 10.24 kg/m²
MINERAL FIBER INSULATION (M2)
DRYWALL GUSSETS BRIDGING STUDS

STC 63



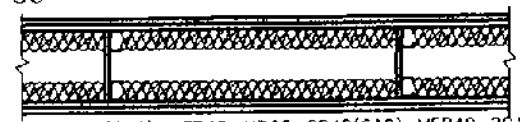
G13_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_G13
(TL-93-308)

STC 59



G13_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_2G13
(TL-93-307)

STC 53



2G13_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_2G13
(TL-93-305)

PROJECT DESCRIPTION

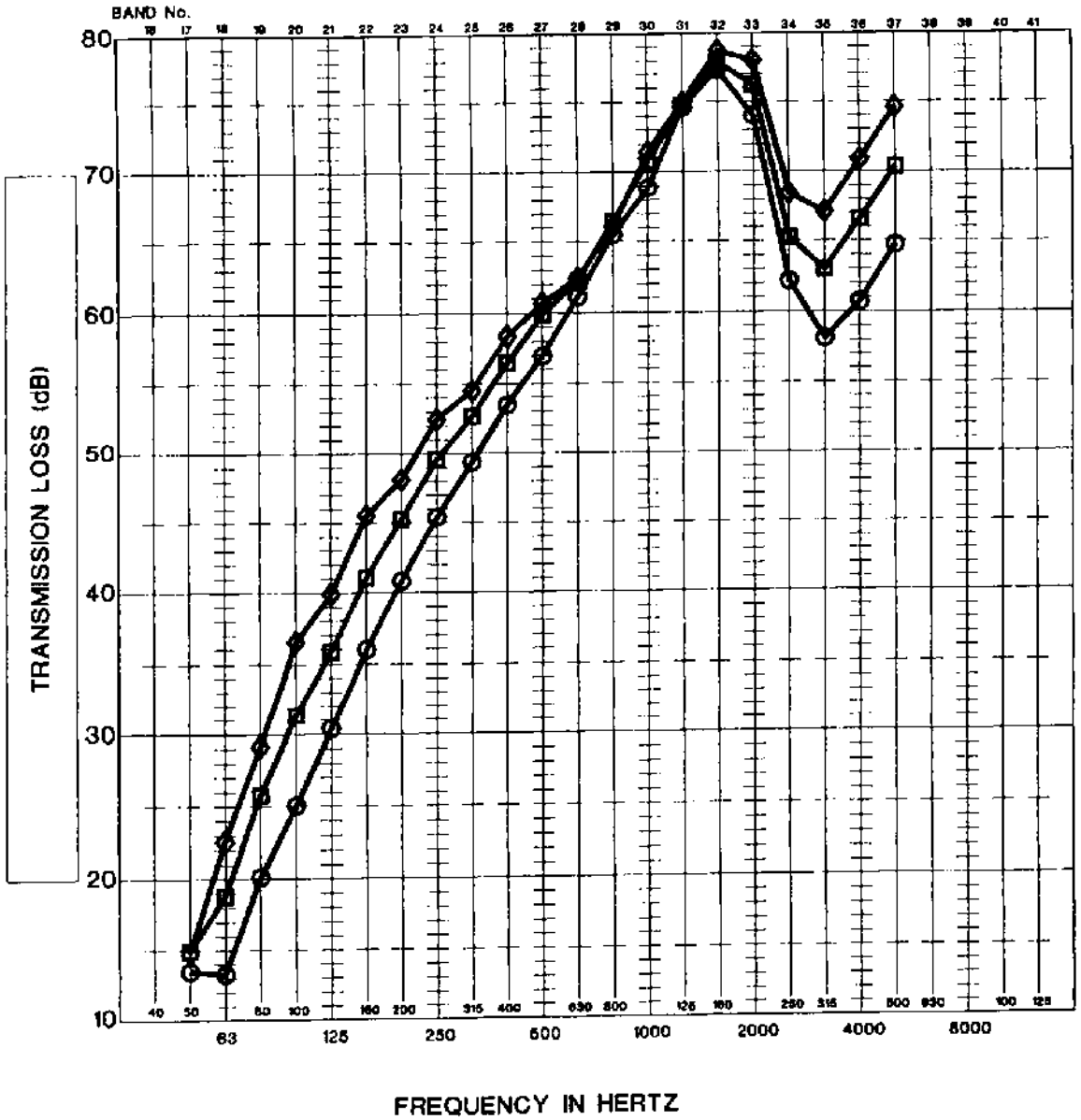
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 47	**FILE NAME** 177GRA047
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



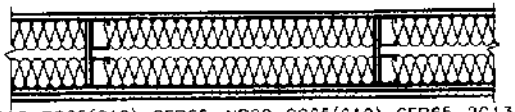
LEGEND

DOUBLE ROW OF 65mm STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
13 mm TYPE 'X' GYPSUM BOARDS :10.34 kg/m²
DRYWALL GUSSETS BRIDGING STUDS

STC 62

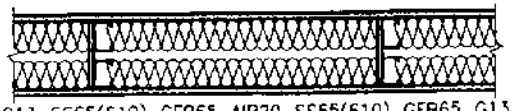
2G13_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_2G13
(TL-93-305)

STC 60



G13_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_2G13
(TL-93-304)

STC 54



G13_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_G13
(TL-93-303)

PROJECT DESCRIPTION

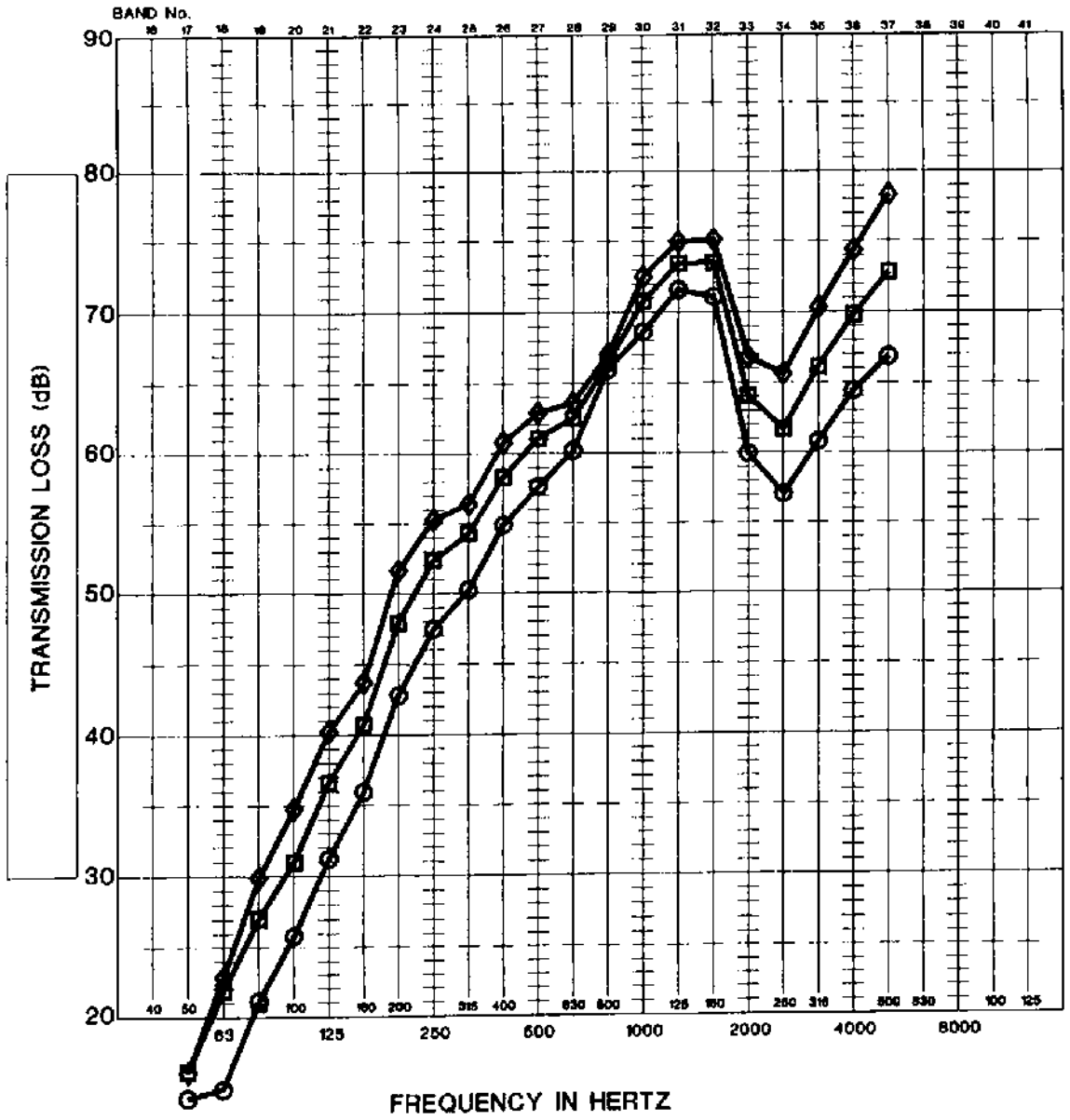
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 48	**FILE NAME** 177GRA048
PROJECT NUMBER 177 011	**DATE** 2001 12

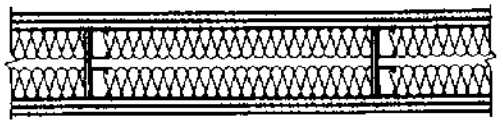
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

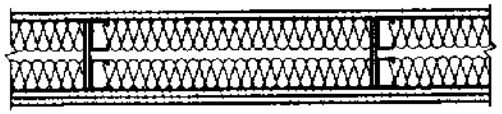
DOUBLE ROW OF 65mm STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' BOARDS 11.43 kg/m
DRYWALL GUSSETS BRIDGING STUDS

STC 64



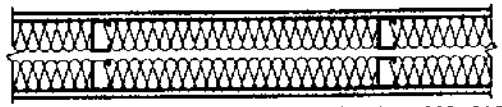
2G16_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_2G16
(TL-93-302)

STC 61



G16_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_2G16
(TL-93-301)

STC 55



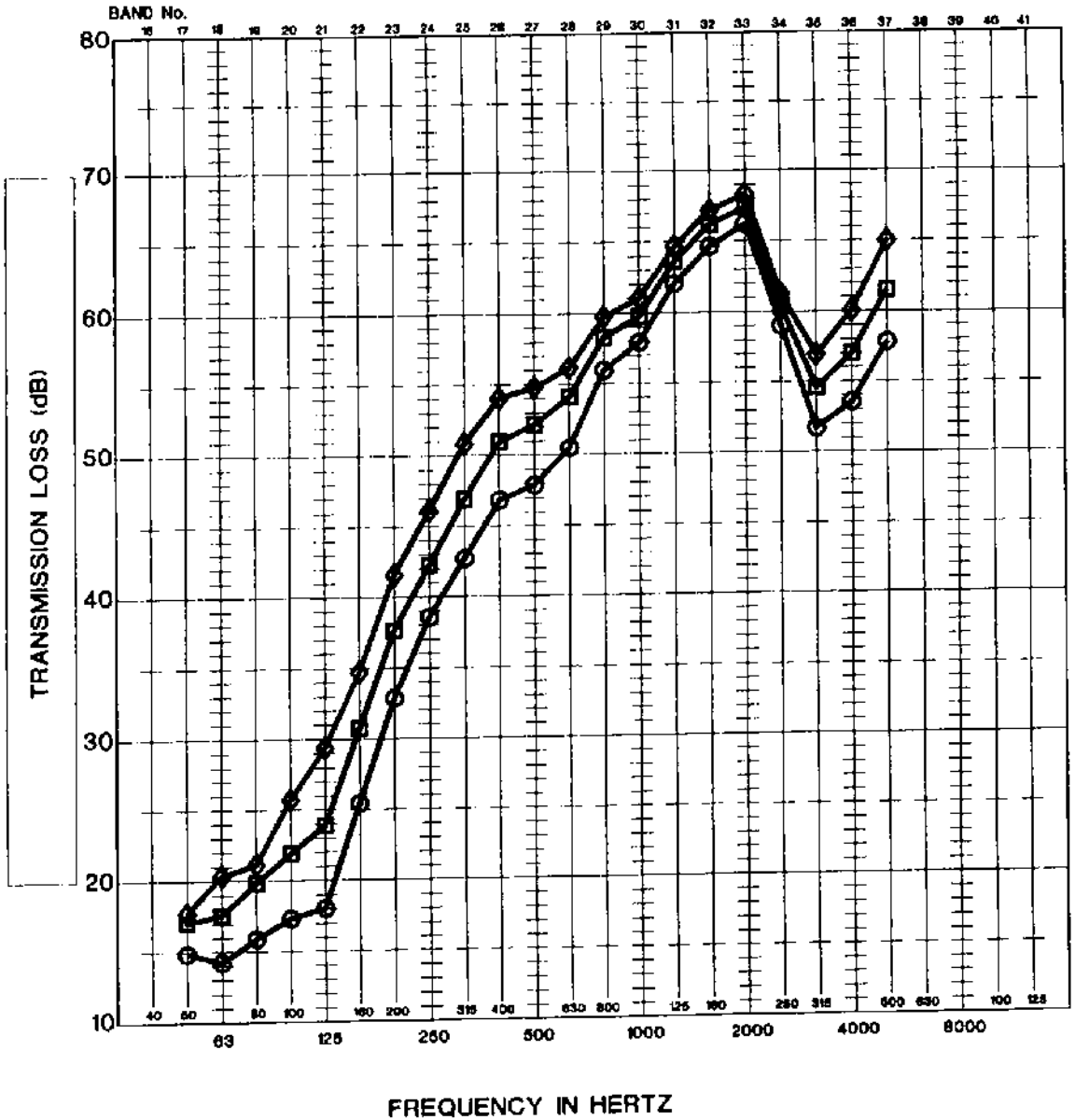
G16_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_G16
(TL-93-300)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 49	**FILE NAME** 177GRA049
PROJECT NUMBER 177 011	**DATE** 2001 12

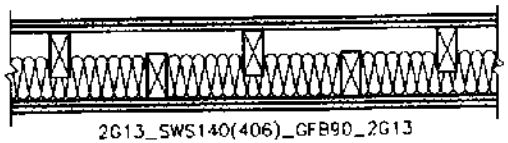
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STAGGERED 140mm WOOD STUDS @ 406mm
GLASS FIBER INSULATION (G1)
13mm LIGHT WEIGHT GYPSUM BOARDS : 7.34 kg/m²

STC 53

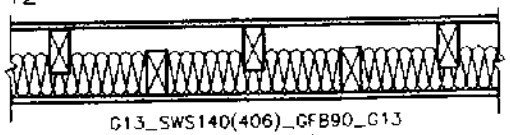


2G13_SWS140(406)_GFB90_2G13
(TL-93-436)

STC 48

G13_SWS140(406)_GFB90_2G13
(TL-93-435)

STC 42



G13_SWS140(406)_GFB90_G13
(TL-93-434)

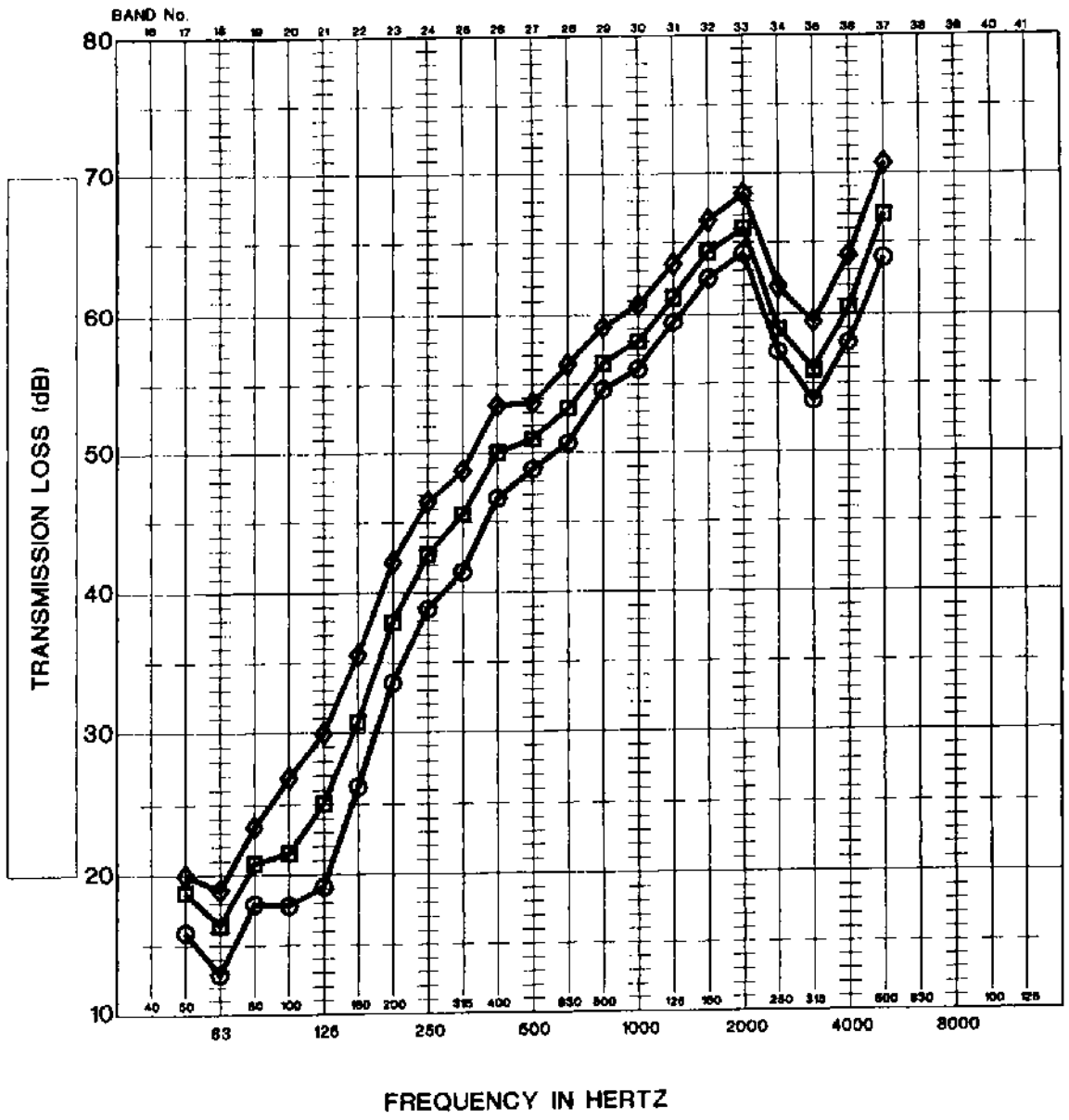
PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 50	**FILE NAME:** 177GRA050
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

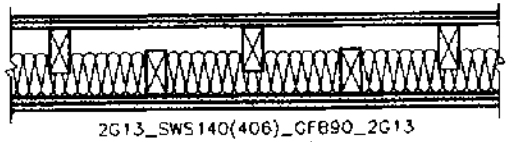
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STAGGERED140mm WOOD STUDS @ 406mm
GLASS FIBER INSULATION (G1)
13mm GYPSUM BOARDS · 8.24 kg/m²

STC 54

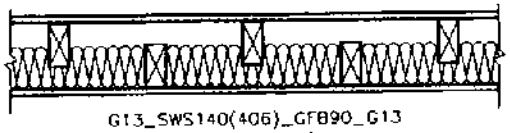


2G13_SWS140(406)_GFB90_2G13
(TL-93-230)

STC 49

G13_SWS140(406)_GFB90_2G13
(TL-93-229)

STC 43



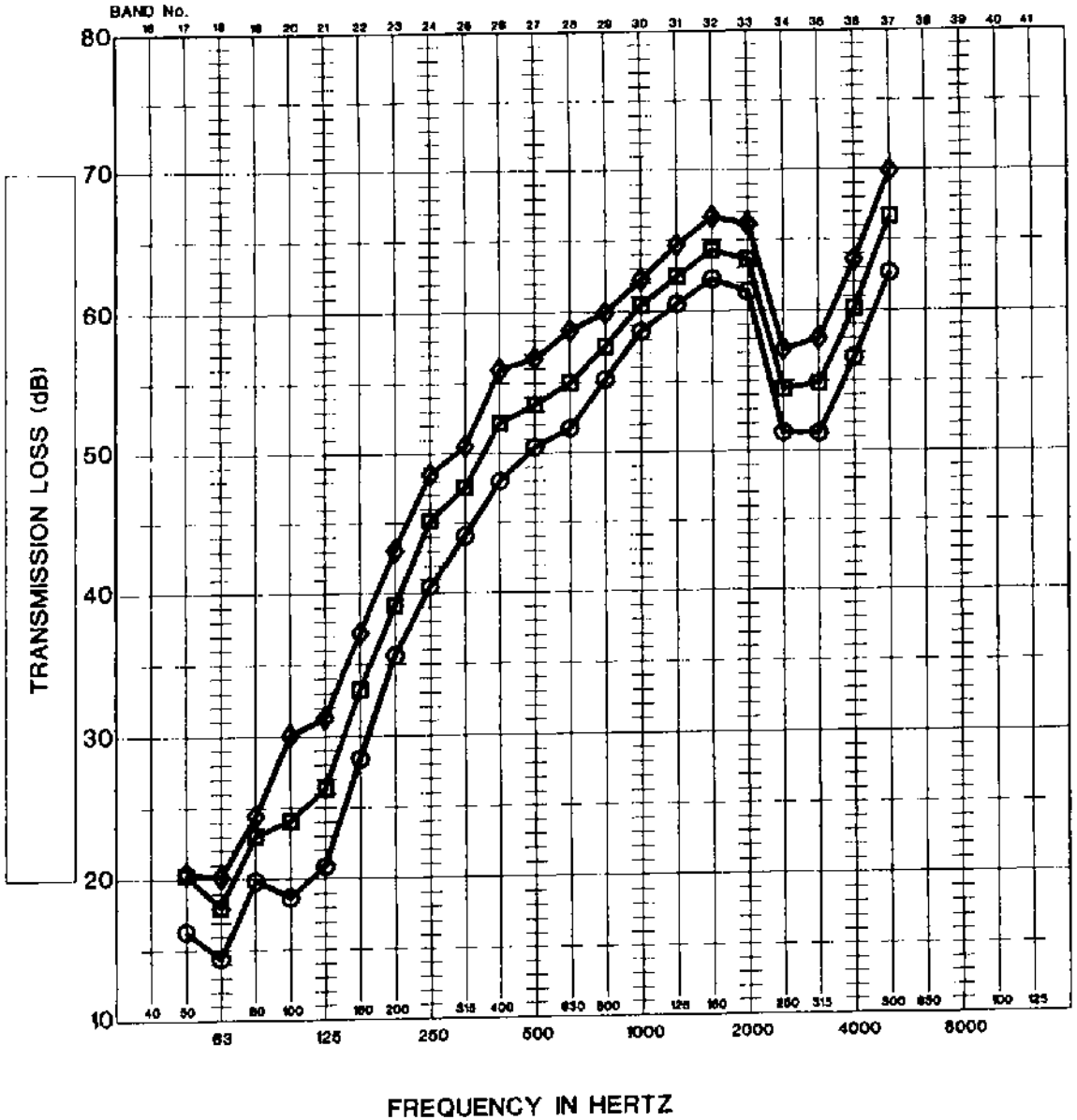
G13_SWS140(406)_GFB90_G13
(TL-93-228)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 51	**FILE NAME:** 177GRA051
PROJECT NUMBER 177.011	**DATE** 2001 12

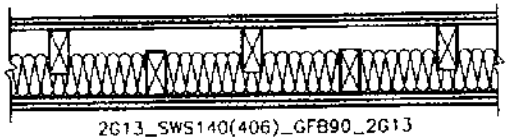
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

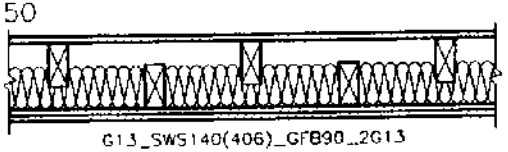
STAGGERED 140mm WOOD STUDS @ 406mm
GLASS FIBER INSULATION (G1)
13mm TYPE 'X' GYPSUM
BOARDS 9 95 kg/m²

STC 55



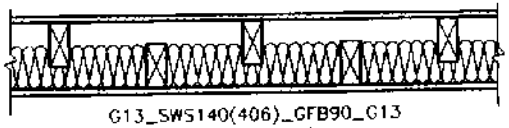
2G13_SWS140(406)_GFB90_2G13
(TL-93-210)

STC 50



G13_SWS140(406)_GFB90_2G13
(TL-93-209)

STC 45



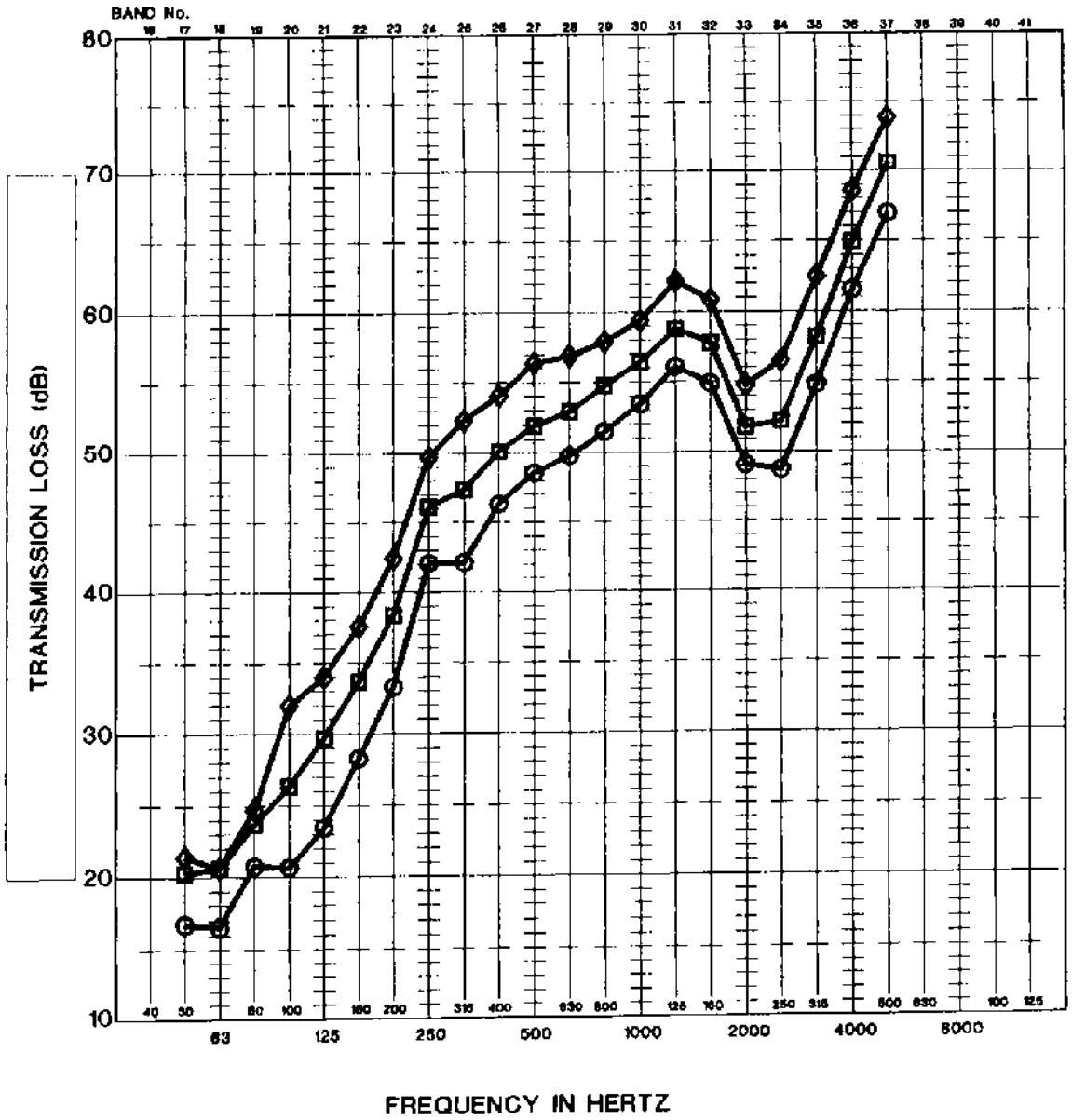
G13_SWS140(406)_GFB90_G13
(TL-93--208)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 52	**FILE NAME** 177GRA052
PROJECT NUMBER 177.011	**DATE** 2001 12

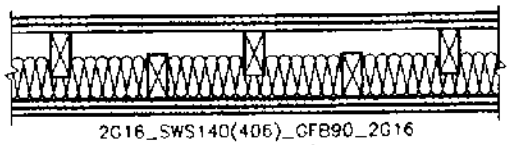
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STAGGERED 140mm WOOD STUDS @ 406mm
GLASS FIBER INSULATION (G1)
16mm TYPE 'X' GYPSUM
BOARDS 11.35 kg/m²

STC 56

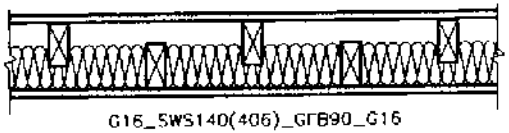


2G16_SWS140(406)_GFB90_2G16
(TL-93-227)

STC 52

G16_SWS140(406)_GFB90_2G16
(TL-93-226)

STC 47



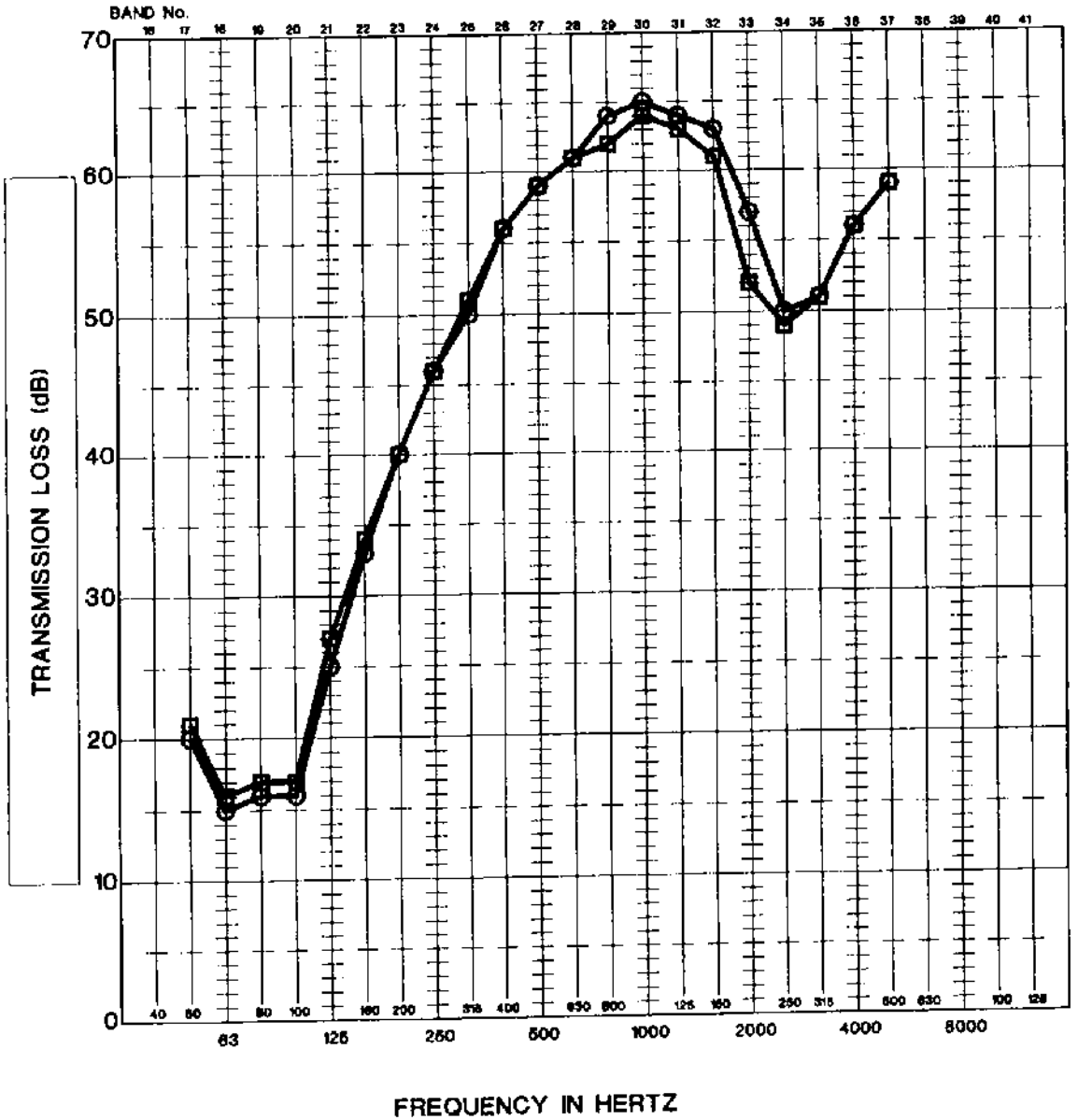
G16_SWS140(406)_GFB90_G16
(TL-93-225)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING LAYERS OF GYPSUM BOARDS

GRAPH NUMBER 53	**FILE NAME** 177GRA053
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



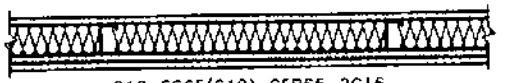
LEGEND

STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM: 11.0 kg/m^2

O——O (STC 49)
WITH 16mm GYPSUM BOARD SUBSTITUTED FOR 13mm GYPSUM BOARD ON ONE SIDE

G16_SS65(610)_GFB65_G16_G13
(TL-93-035)

□——□ (STC 51)
WITH TWO 16mm GYPSUM BOARDS ON ONE SIDE



G16_SS65(610)_GFB65_2G16
(TL-93-036)

PROJECT DESCRIPTION

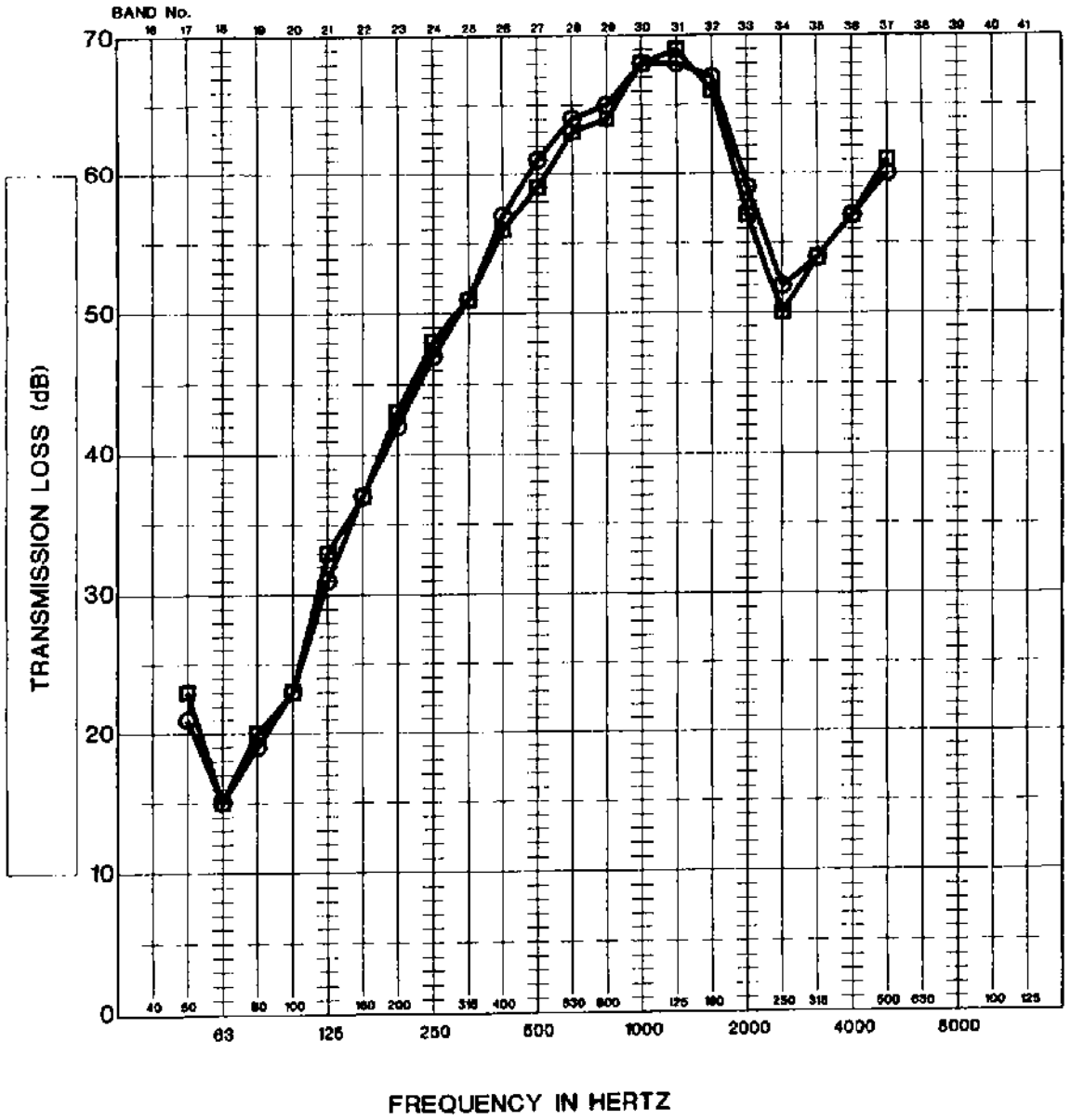
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF SUBSTITUTING A 16mm GYPSUM BOARD BY A 13mm GYPSUM BOARD (8.0 kg/m^2)

GRAPH NUMBER 54	**FILE NAME** 177GRA054
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM

O——O (STC 55)
WITH 16mm GYPSUM BOARD SUBSTITUTED FOR 13mm GYPSUM BOARD ON ONE SIDE

G16_SS90(610)_GFB90_G16_G13
(TL-92-370)

□——□ (STC 54)
WITH TWO 16mm GYPSUM BOARDS ON ONE SIDE

G16_SS90(610)_GFB90_2G16
(TL-92-368)

PROJECT DESCRIPTION

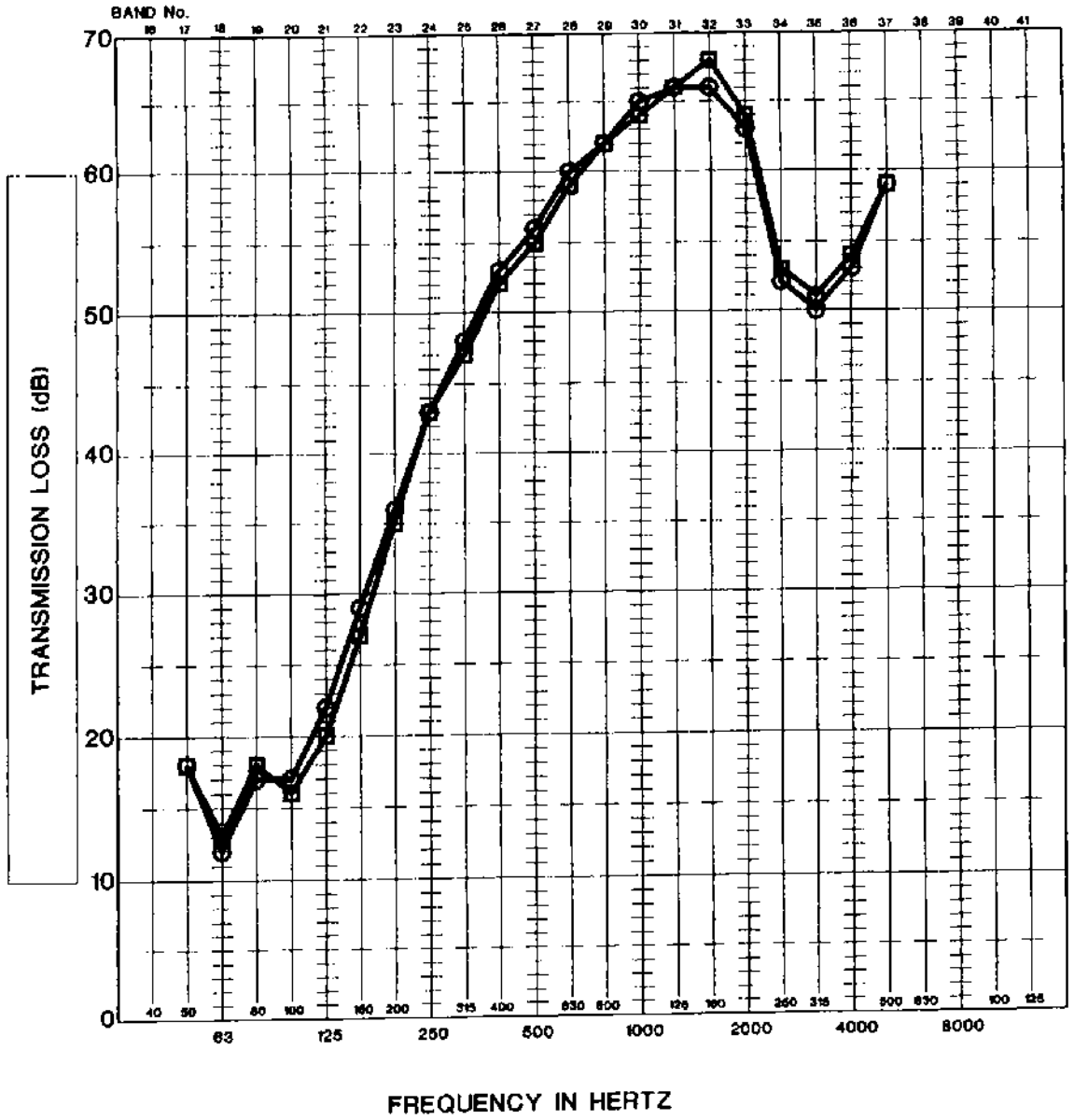
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF SUBSTITUTING A 16mm GYPSUM BOARD BY A 13mm GYPSUM BOARD (8.2 kg/m^2)

GRAPH NUMBER 55	**FILE NAME** 177GRA055
PROJECT NUMBER 177 011	**DATE** 2001_12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
13 mm TYPE 'X' GYPSUM

STUD SET 31 (STC 46)

G13_WS90(406)_GFB90_RC13(610)_G13
(TL-93-125)

STUD SET 34 (STC 44)

G13_WS90(406)_GFB90_RC13(610)_G13
(TL-93-177)

PROJECT DESCRIPTION

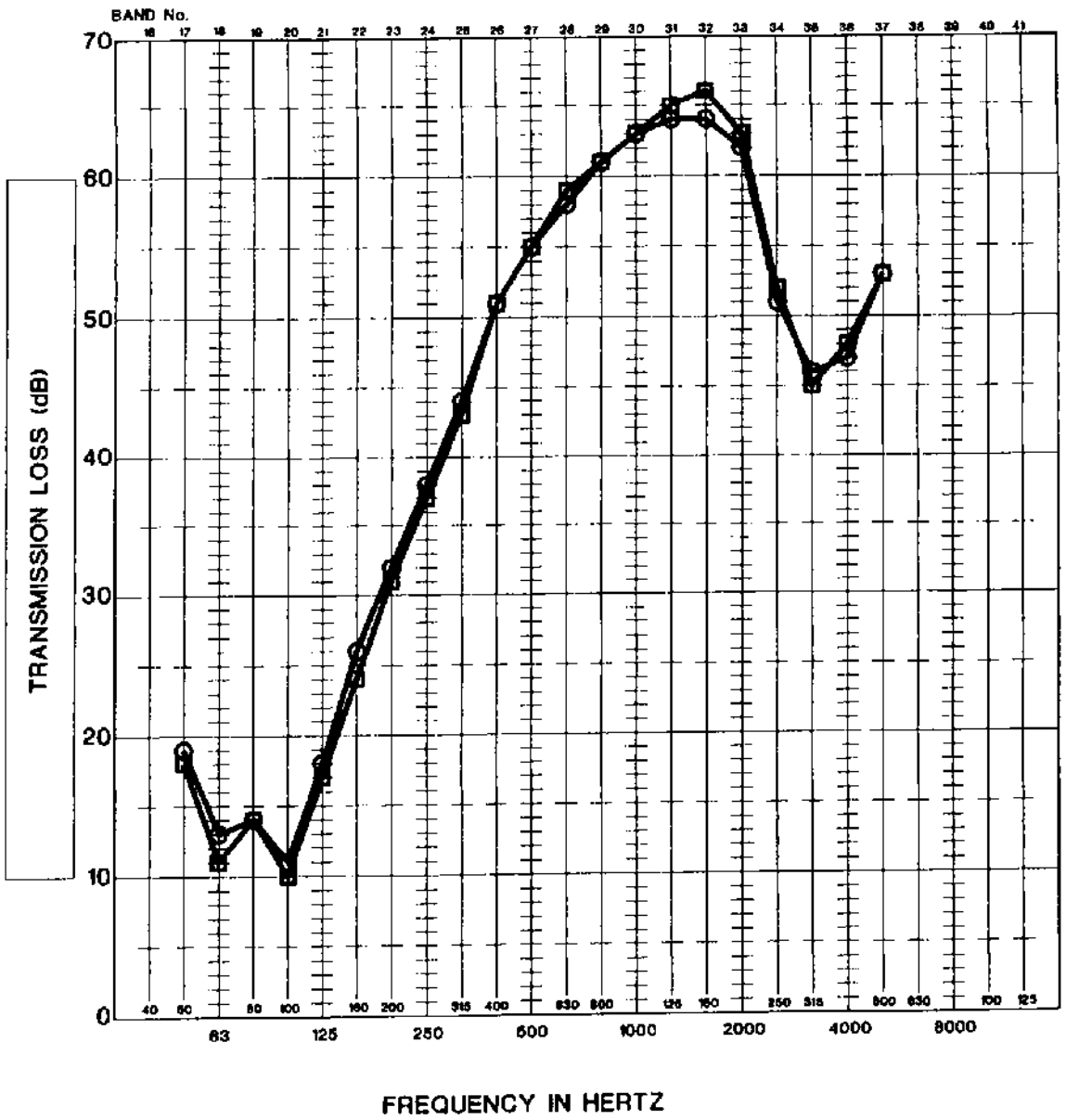
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 56	**FILE NAME** 177GRA056
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm o c
GLASS FIBER INSULATION (G1)
13 mm GYPSUM BOARDS

STUD SET 11 (STC 42)

G13_SS90(406)_GFB90_G13
(TL-92-428)

STUD SET 16 (STC 41)

G13_SS90(406)_GFB90_G13
(TL-93-347)

PROJECT DESCRIPTION

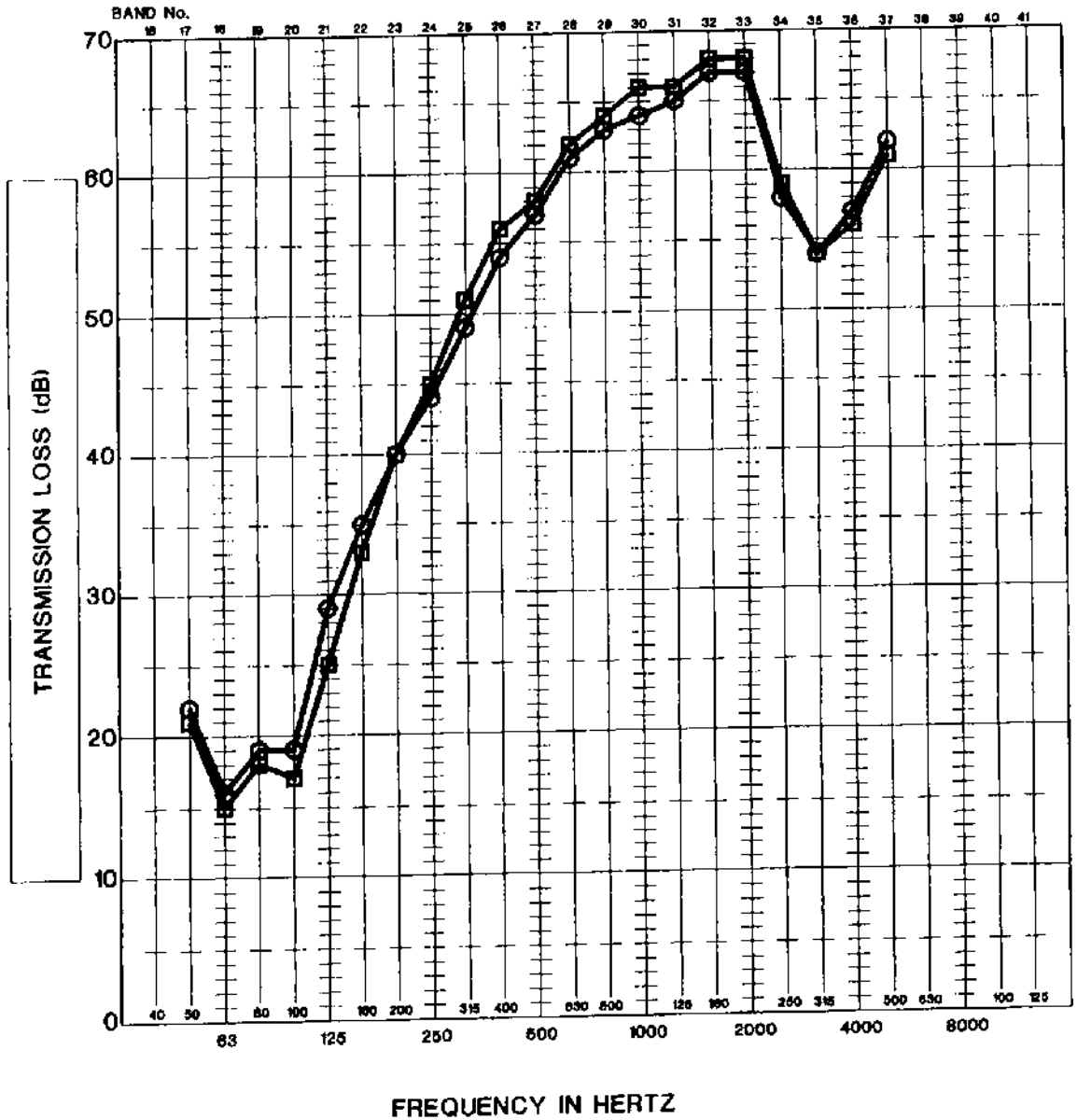
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 57	**FILE NAME** 177GRA057
PROJECT NUMBER 177.011	**DATE** 2001 12

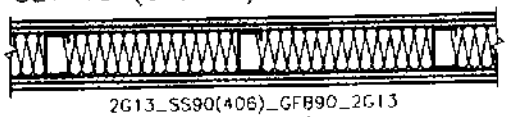
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
13 mm GYPSUM BOARDS

STUD SET 16 (STC 49)



2G13_SS90(406)_GFB90_2G13
(TL-93-349)

STUD SET 11 (STC 53)

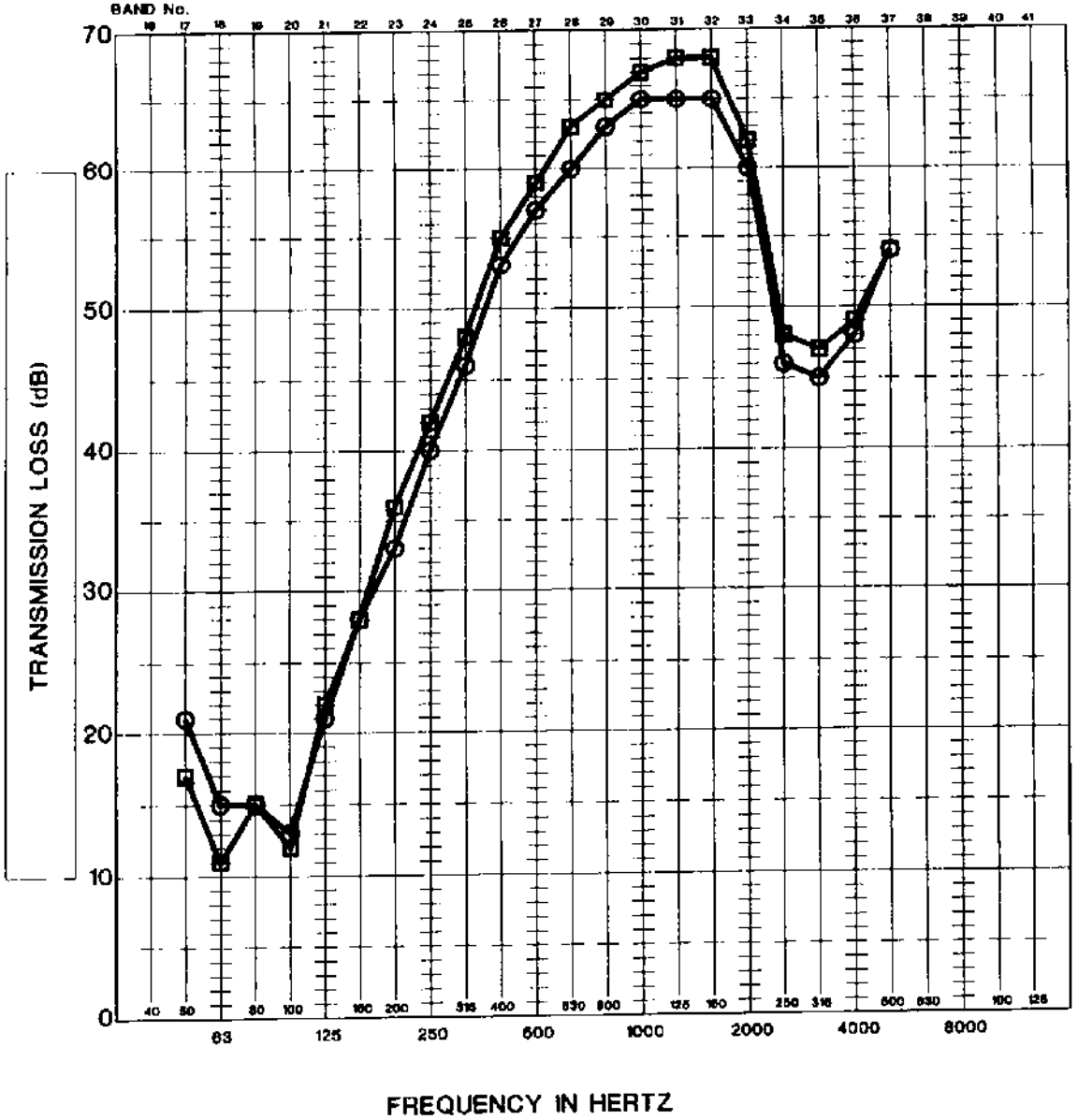
2G13_SS90(406)_GFB90_2G13
(TL-92-430)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON OF STUD SETS

GRAPH NUMBER 58	**FILE NAME:** 177GRA058
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
13 mm TYPE 'X' GYPSUM BOARDS

STUD SET 16 (STC 46)

G13_SS90(406)_GFB90_G13
(TL-93-344)

STUD SET 10 (STC 45)

G13_SS90(406)_GFB90_G13
(TL-92-422)

PROJECT DESCRIPTION

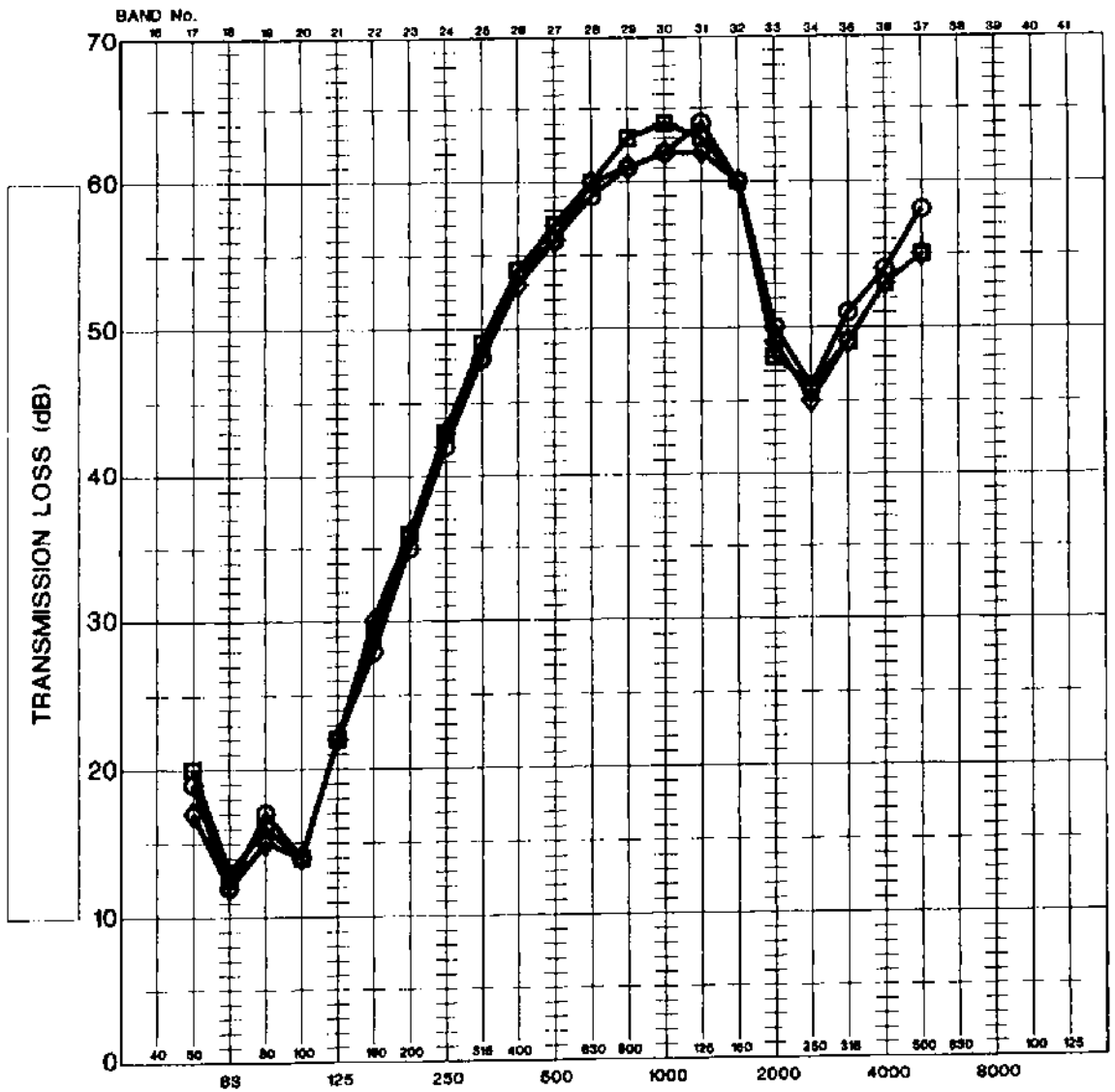
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 59	**FILE NAME** 177GRA059
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM BOARDS

STUD SET 17 (STC 46)

G16_S590(406)_GFB90_G16
(TL-93-360)

STUD SET 16 (STC 46)

G16_S590(406)_GFB90_G16
(TL-93-352)

STUD SET 18 (STC 46)

G16_S590(406)_GFB90 G16
(TL-94-026)

PROJECT DESCRIPTION

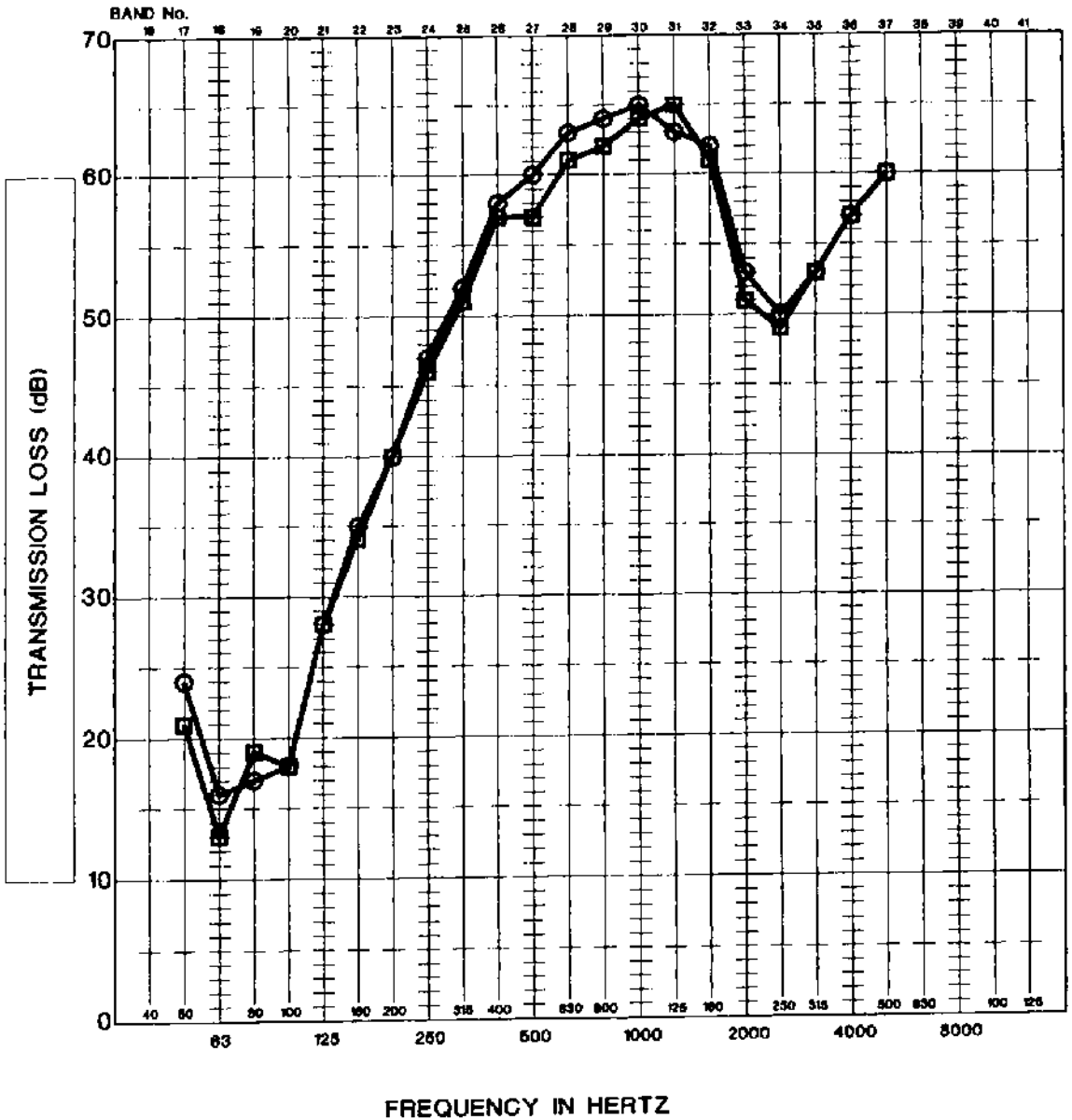
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 60	**FILE NAME** 177GRA060
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM BOARDS

STUD SET 10 (STC 52)

G16_SS90(406)_GFB90_2G16
(TL-92-420)

STUD SET 16 (STC 52)

G16_SS90(406)_GFB90_2G16
(TL-93-350)

PROJECT DESCRIPTION

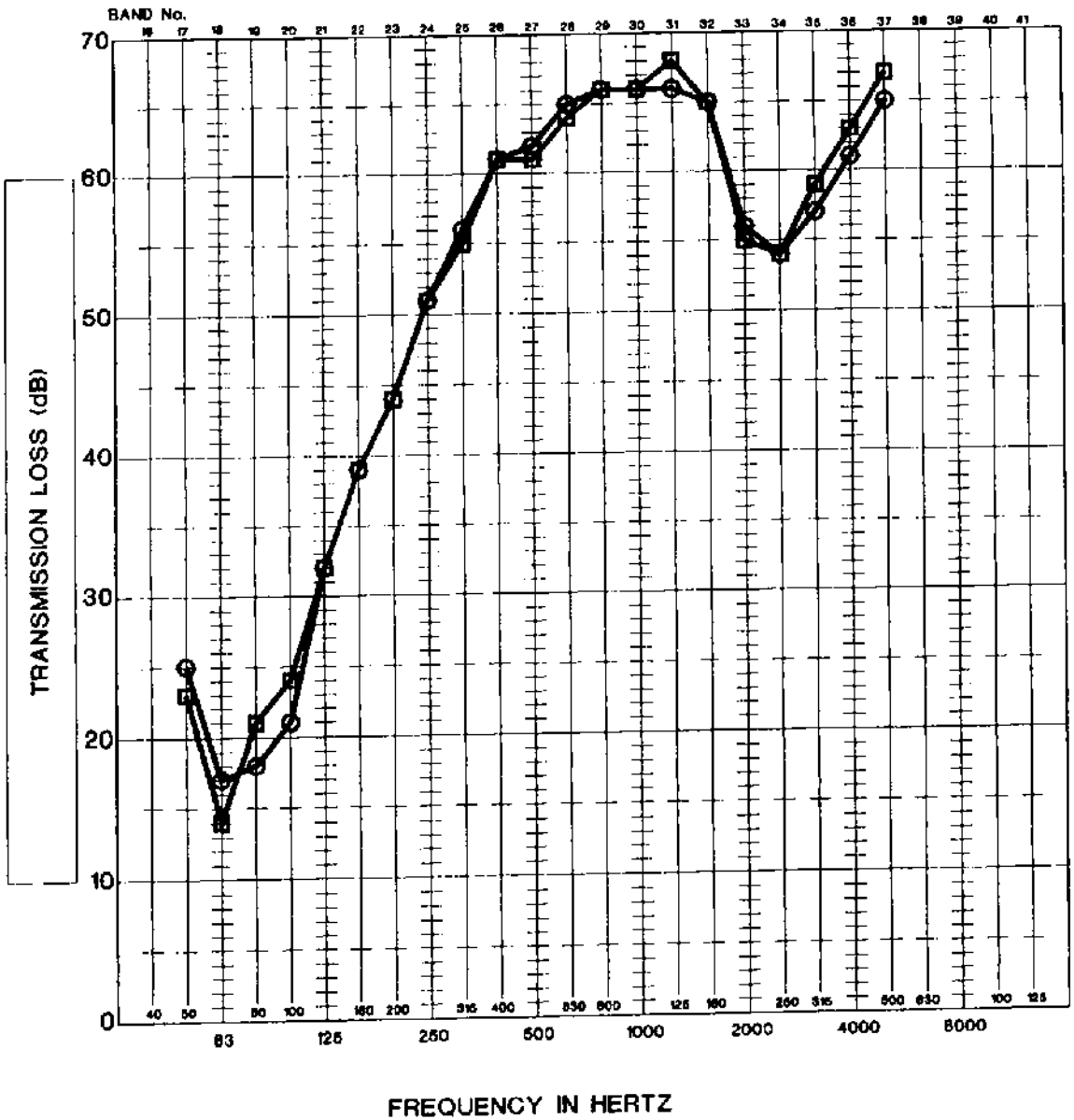
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 61	**FILE NAME** 177GRA061
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



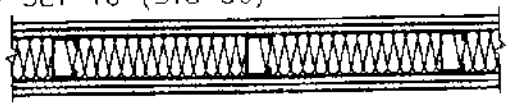
LEGEND

STEEL STUDS @ 406 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM BOARDS

STUD SET 16 (STC 56)

2G16_SS90(406)_GFB90_2G16
(TL-93-351)

STUD SET 10 (STC 56)



2G16_SS90(406)_GFB90_2G16
(TL-92-421)

PROJECT DESCRIPTION

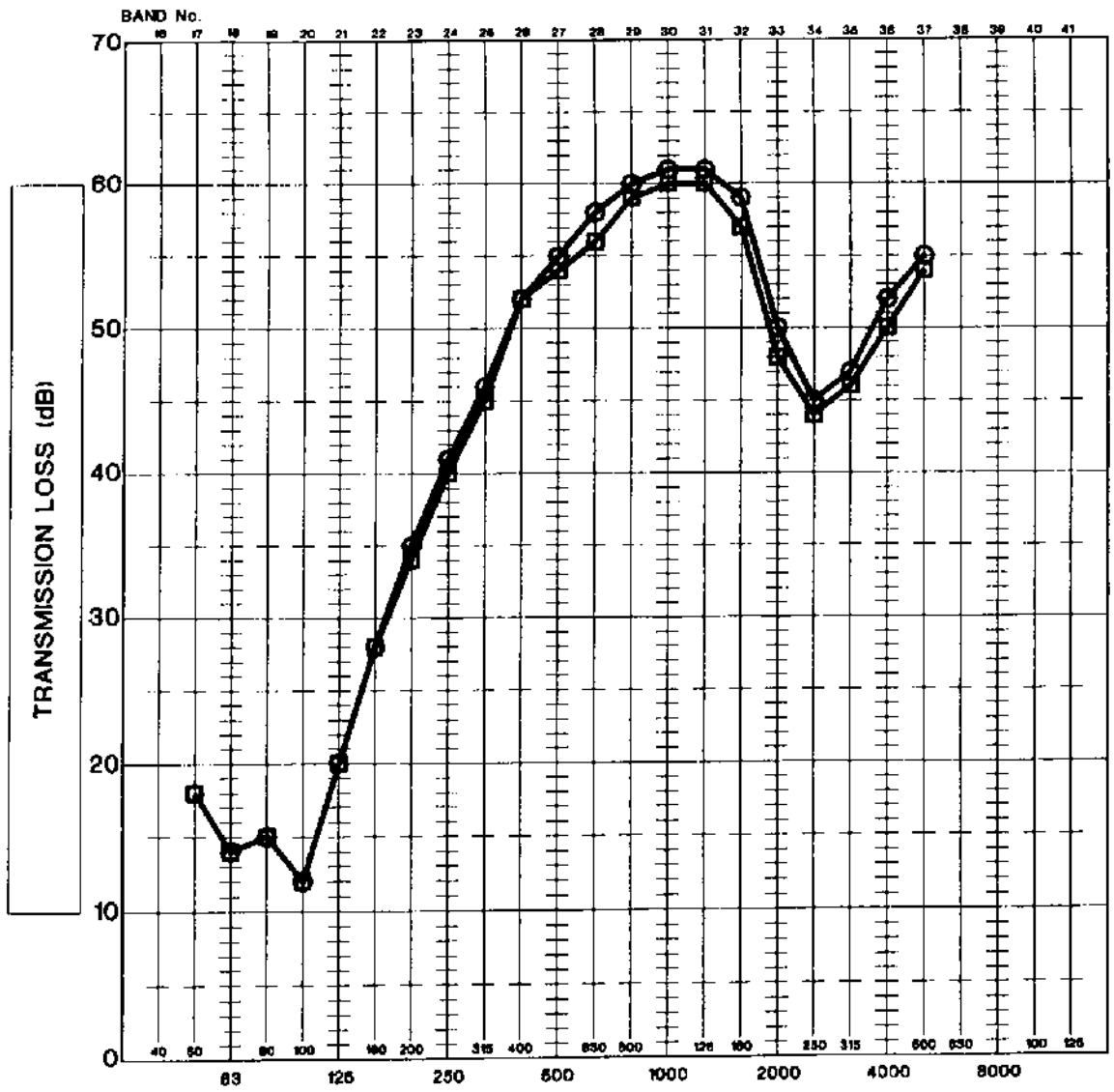
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 62	**FILE NAME** 177GRA062
PROJECT NUMBER 177.011	**DATE** 2001 12

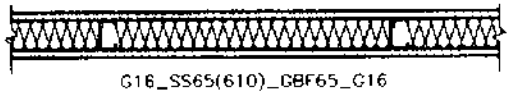
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

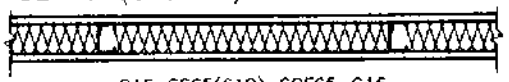
65 mm STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM BOARDS

STUD SET 7 (STC 44)



G16_SS65(610)_GBF65_G16
(TL-93-033)

STUD SET 9 (STC 44)



G16_SS65(610)_GBF65_G16
(TL-93-073)

PROJECT DESCRIPTION

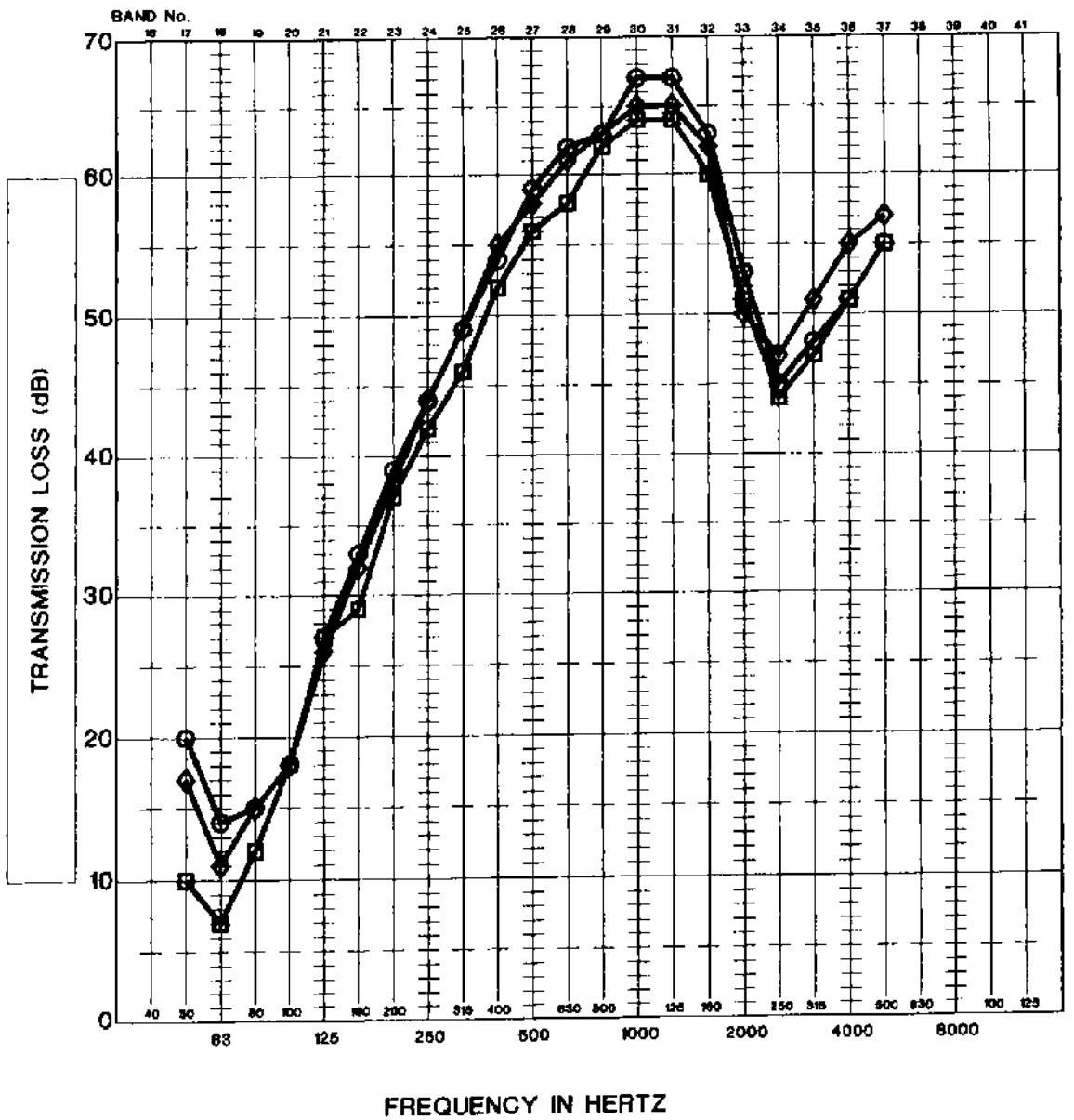
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 63	**FILE NAME** 177GRA063
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM BOARDS

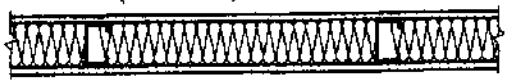
STUD SET 1 (STC 49)

G16_SS90(610)_GFB90_G16
(TL-92-367)

STUD SET 6 (STC 50)

G16_SS90(610)_GFB90_G16
(TL-93-324)

STUD SET 3 (STC 48)



G16_SS90(610)_GFB90_G16
(TL-92-399)

PROJECT DESCRIPTION

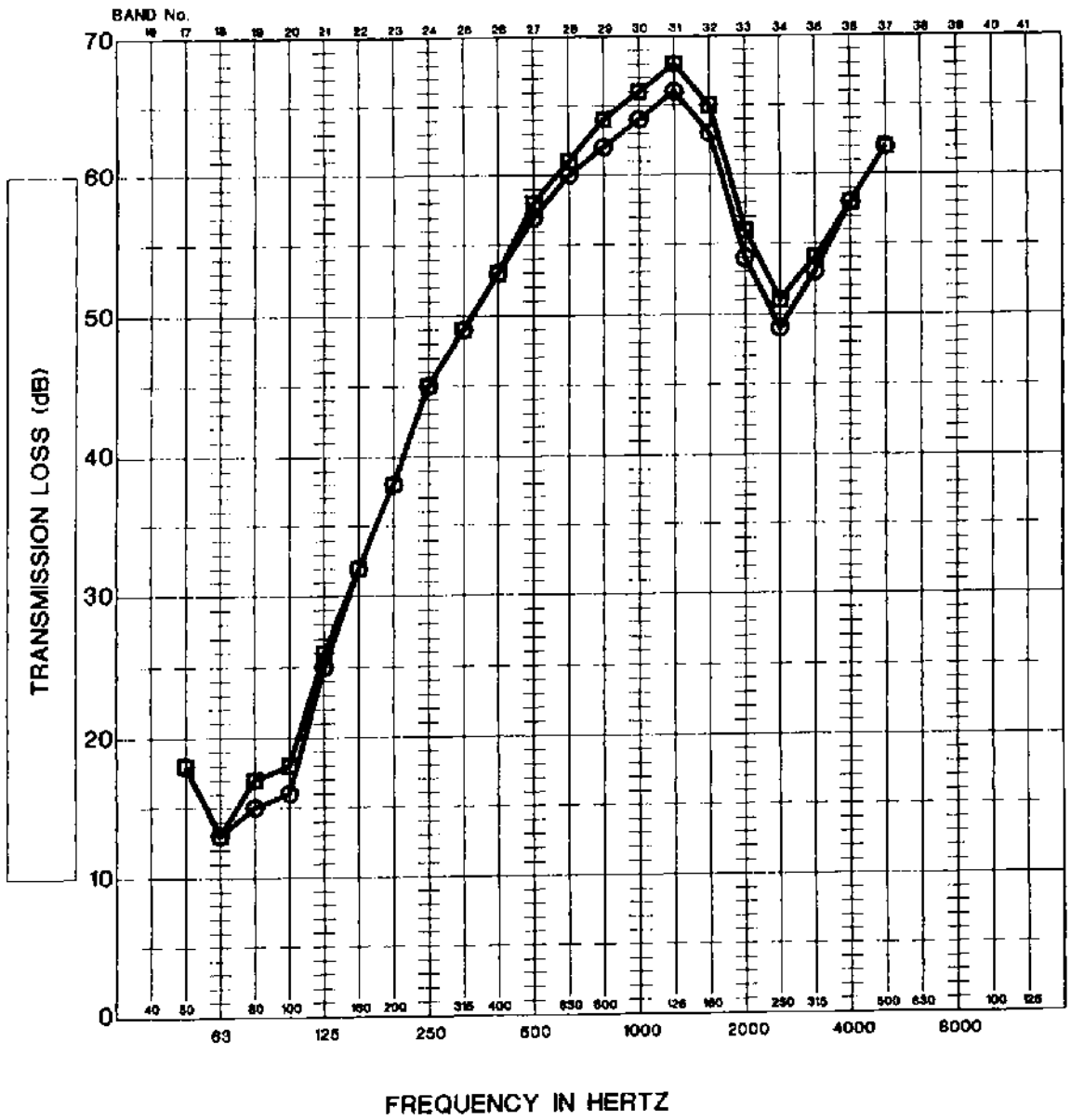
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 64	**FILE NAME** 177GRA064
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM BOARDS

STUD SET 30 (STC 50)

G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-196)

STUD SET 29 (STC 49)

G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-084)

PROJECT DESCRIPTION

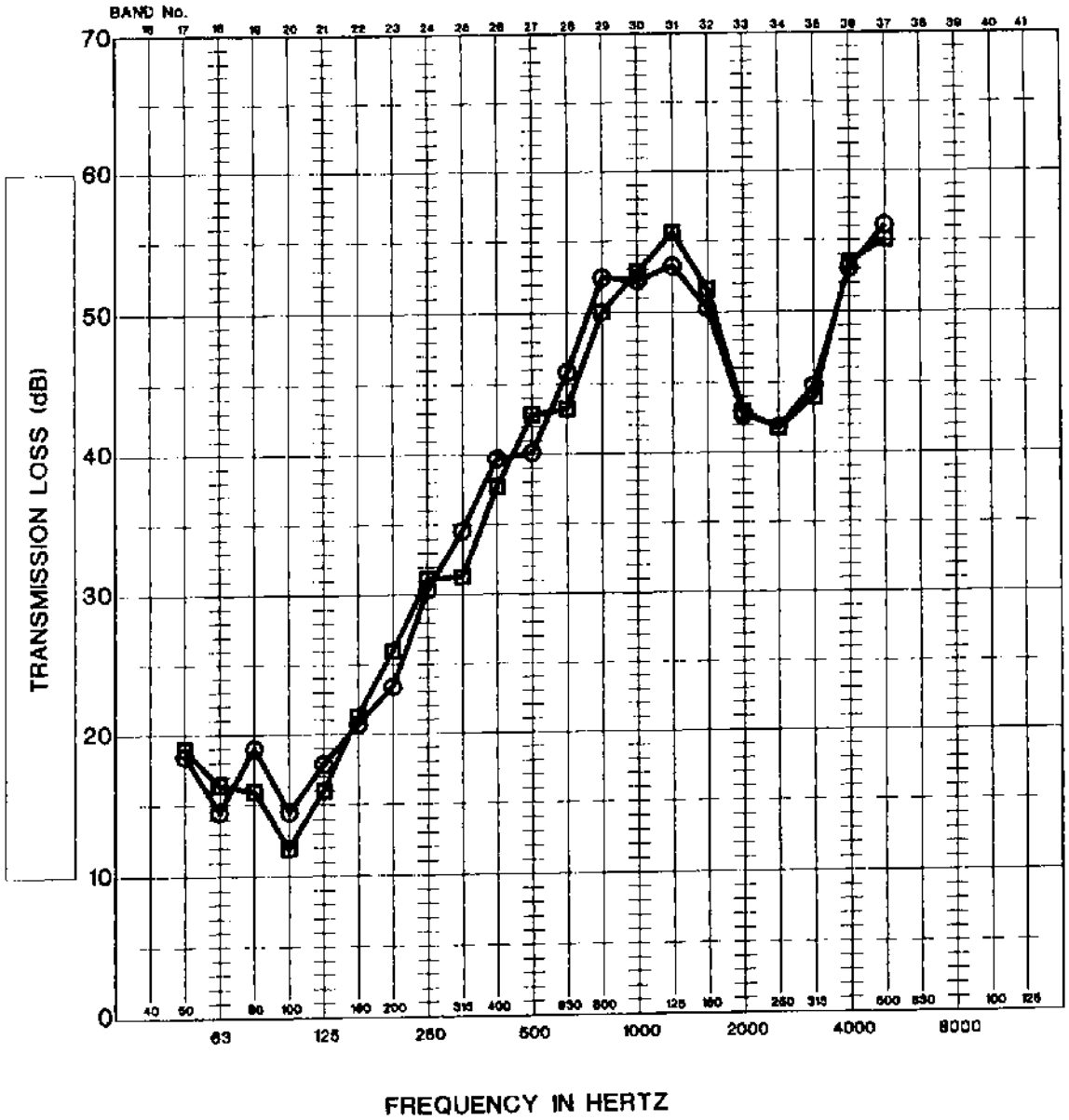
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF STUD SETS

GRAPH NUMBER 64B	**FILE NAME** 177GRA64B
PROJECT NUMBER 177.011	**DATE** 2001 12

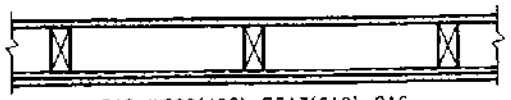
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

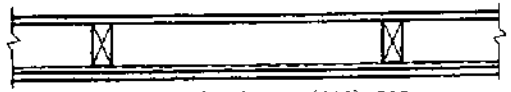
WOOD STUDS
16mm TYPE 'X' GYPSUM BOARDS
EMPTY CAVITY
RESILIENT CHANNELS @ 610mm

STUD SPACING = 406mm (STC 40)



G16_WS90(406)_RC13(610)_G16
(TL-93-122)

STUD SPACING = 610mm (STC 40)



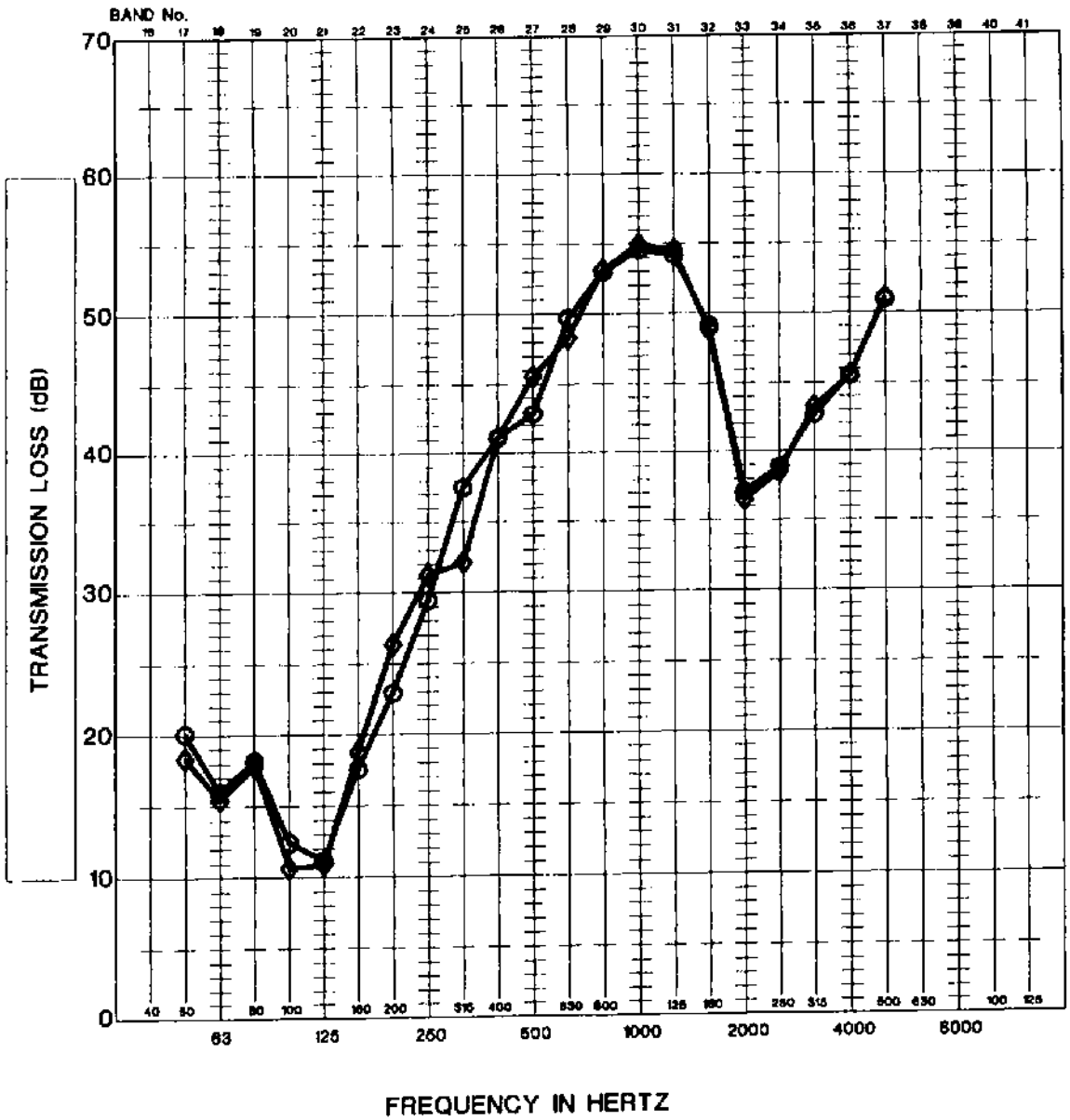
G16_WS90(610)_RC13(610)_G16
(TL-93-089)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 65	**FILE NAME:** 177GRA065
PROJECT NUMBER 177.011	**DATE** 2001 12

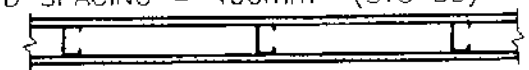
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

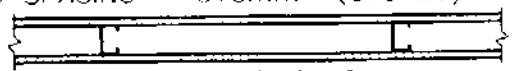
65mm STEEL STUDS
16mm TYPE 'X' GYPSUM BOARDS
EMPTY CAVITY

STUD SPACING = 406mm (STC 35)



G16_SS65(406)_G16
(TL-93-057)

STUD SPACING = 610mm (STC 35)



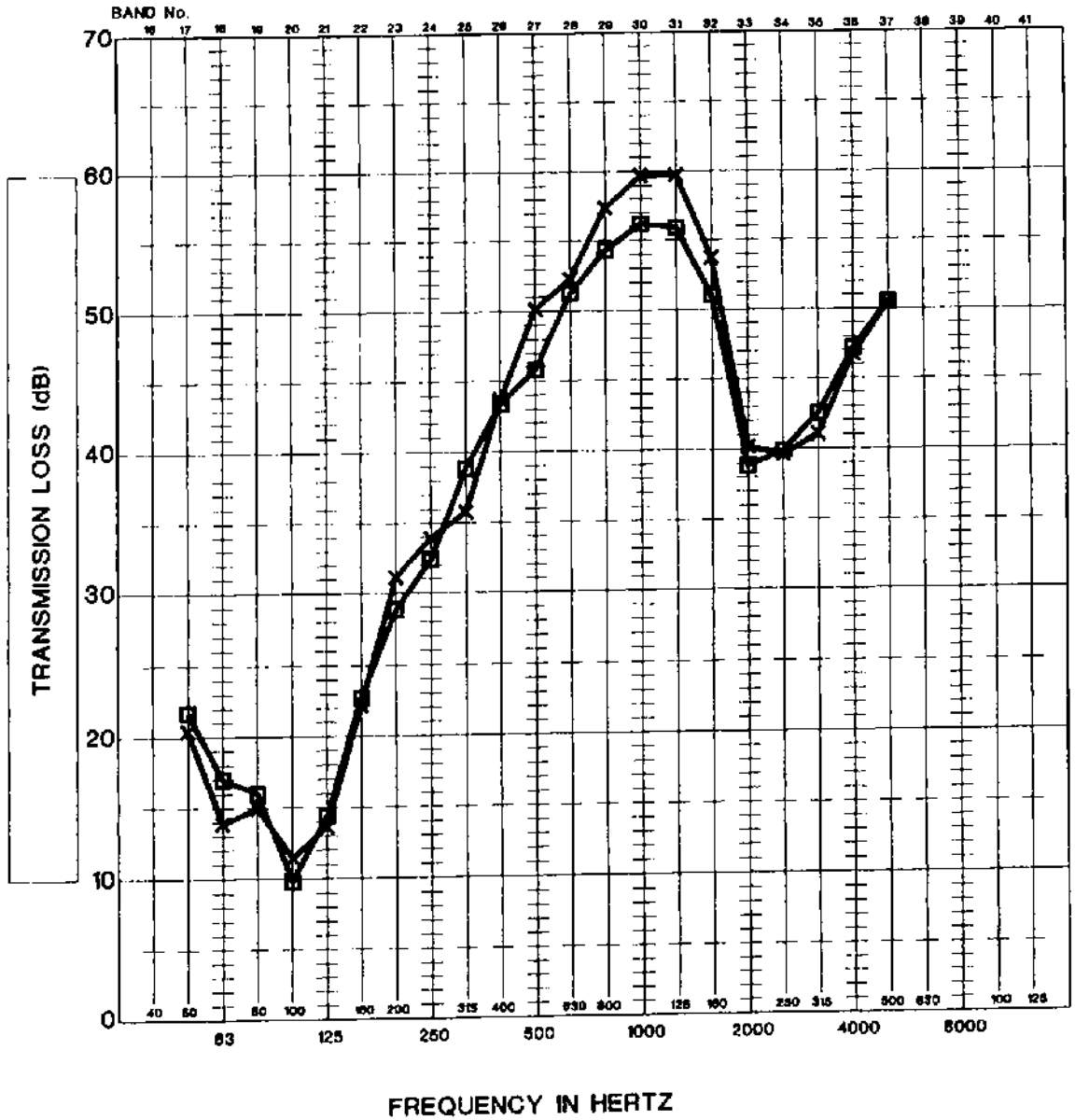
G16_SS65(610)_G16
(TL-93-032)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 66	**FILE NAME** 177GRA066
PROJECT NUMBER 177.011	**DATE** 2001 12

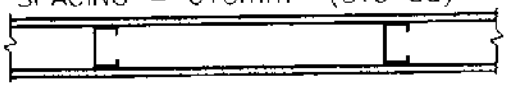
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

90mm STEEL STUDS
16mm TYPE 'X' GYPSUM BOARDS
EMPTY CAVITY

STUD SPACING = 610mm (STC 38)



G16_SS90(610)_G16
(TL-92-376)

STUD SPACING = 406mm (STC 38)

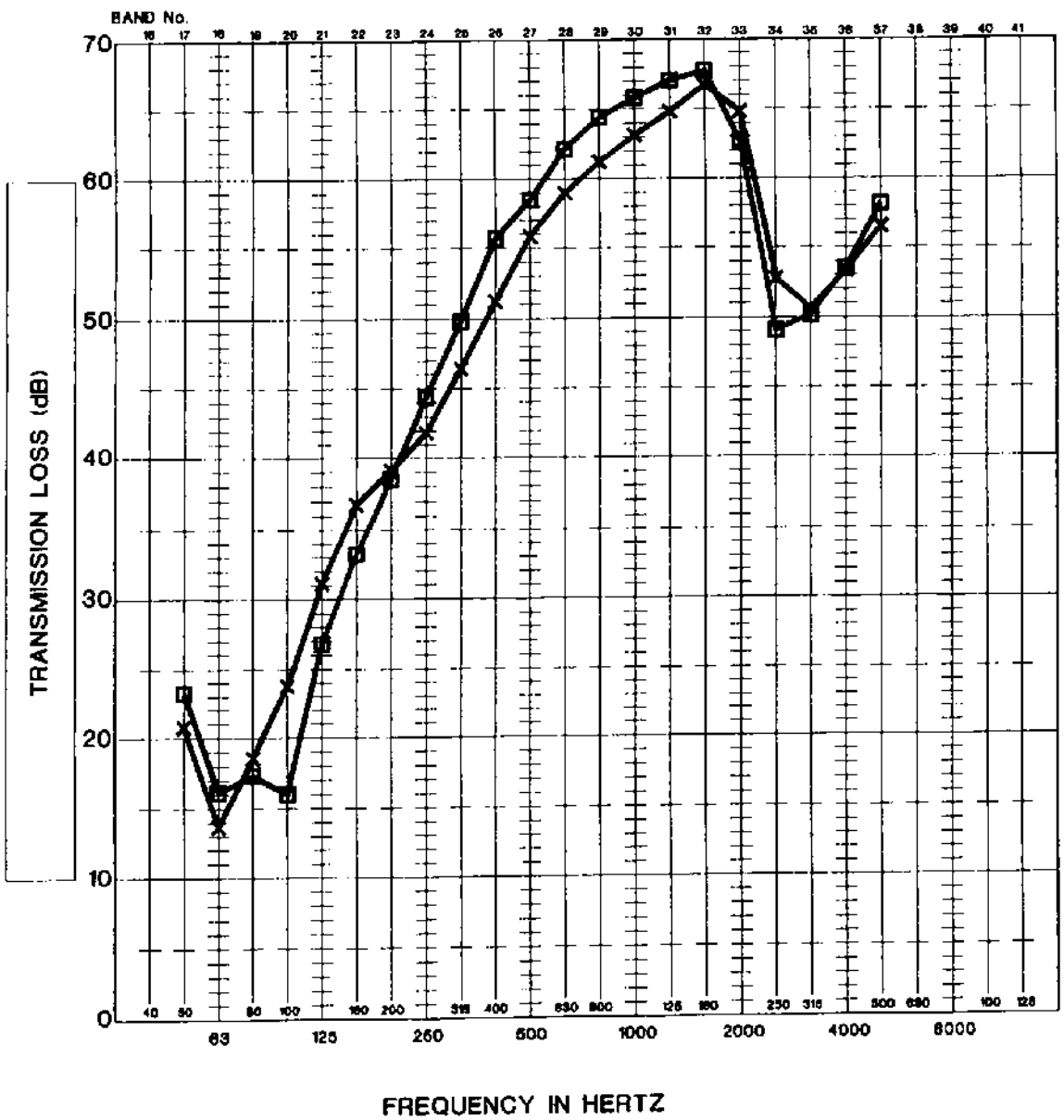
G16_SS90(406)_G16
(TL-92-418)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 67	**FILE NAME:** 177GRA067
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

90mm STEEL STUDS
13 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

STEEL STUDS @ 406mm (STC 51)

G13_SS90(406)_GFB90_2G13
(TL-92-423)

STEEL STUDS @ 610mm (STC 52)

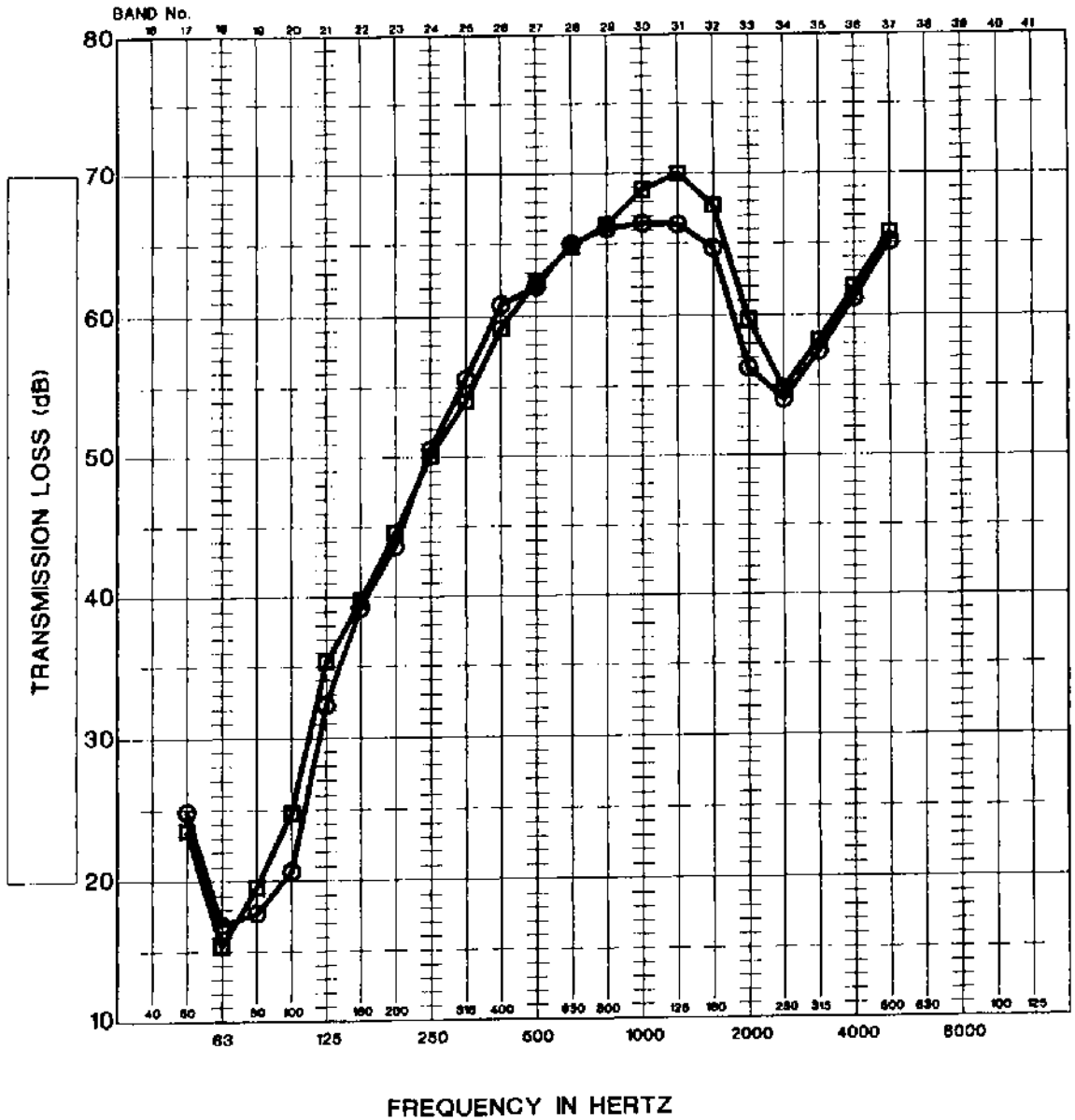
G13_SS90(610)_GFB90_2G13
(TL-92-411)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 68	**FILE NAME** 177GRA068
PROJECT NUMBER 177.011	**DATE** 2001 12

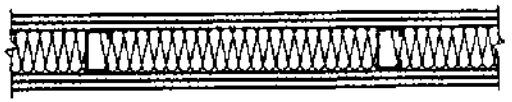
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

90mm STEEL STUDS
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

STEEL STUDS @ 610mm (STC 58)



2G16_SS90(610)_GFB90_2G16
(TL-92-369)

STEEL STUDS @ 406mm (STC 56)

2G16_SS90(406)_GFB90_2G16
(TL 92-421)

PROJECT DESCRIPTION

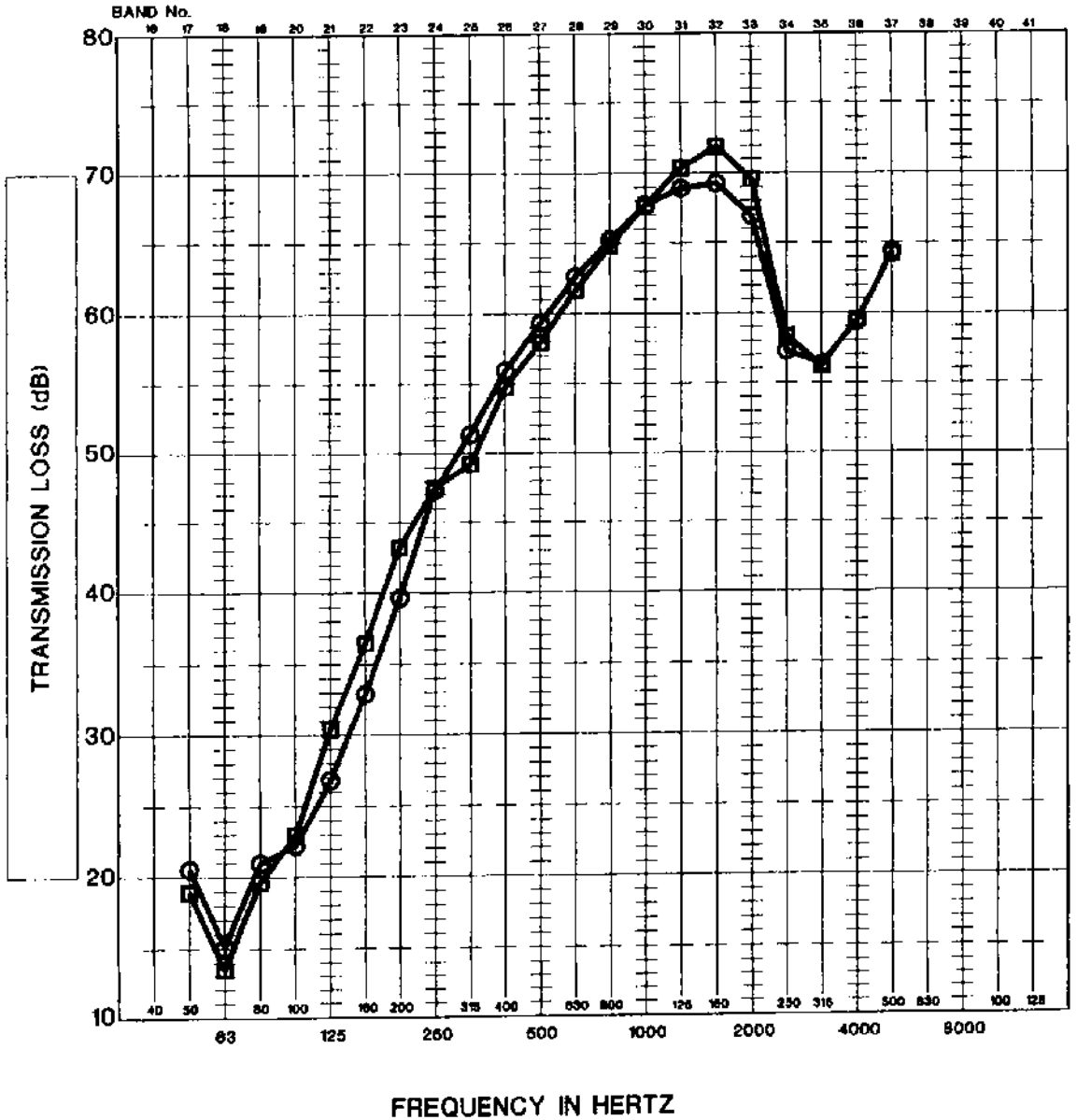
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 69	**FILE NAME:** 177GRA069
PROJECT NUMBER 177.011	**DATE** 2001 12

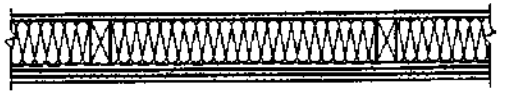
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS
13 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610mm

STUD SPACING = 610mm (STC 54)



G13_WS90(610)_GFB90_RC13(610)_2G13
(TL-93-097)

STUD SPACING = 406mm (STC 51)

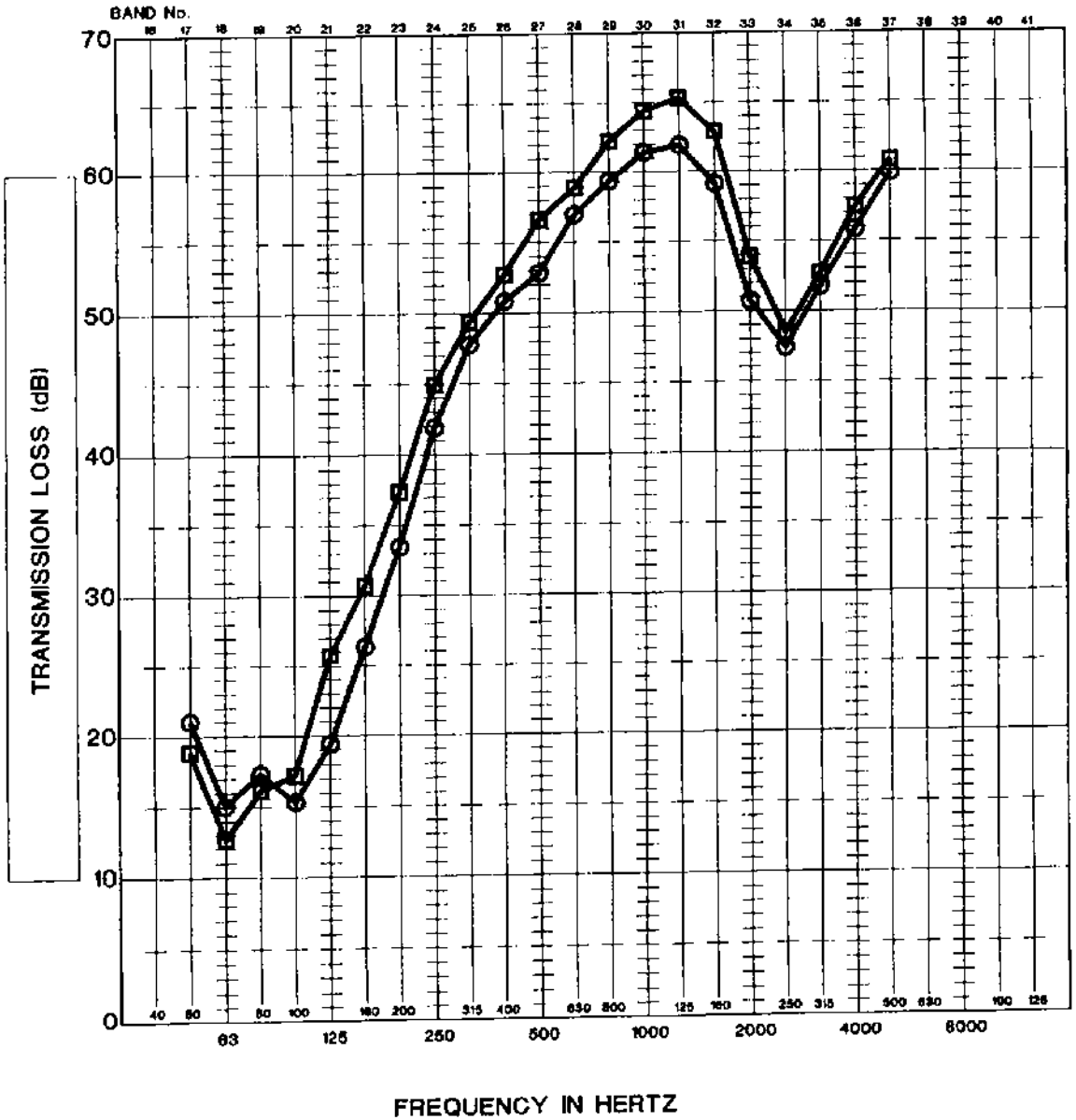
G13_WS90(406)_GFB90_RC13(610)_2G13
(TL-93-126)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 70	**FILE NAME:** 177GRA070
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 406 mm

WOOD STUDS @ 610mm (STC 50)

G16_WS90(610)_GFB90_RC13(406)_G16
(TL-93-098)

WOOD STUDS @ 406mm (STC 43)

G16_WS90(406)_GFB90_RC13(406)_G16
(TL-93-117)

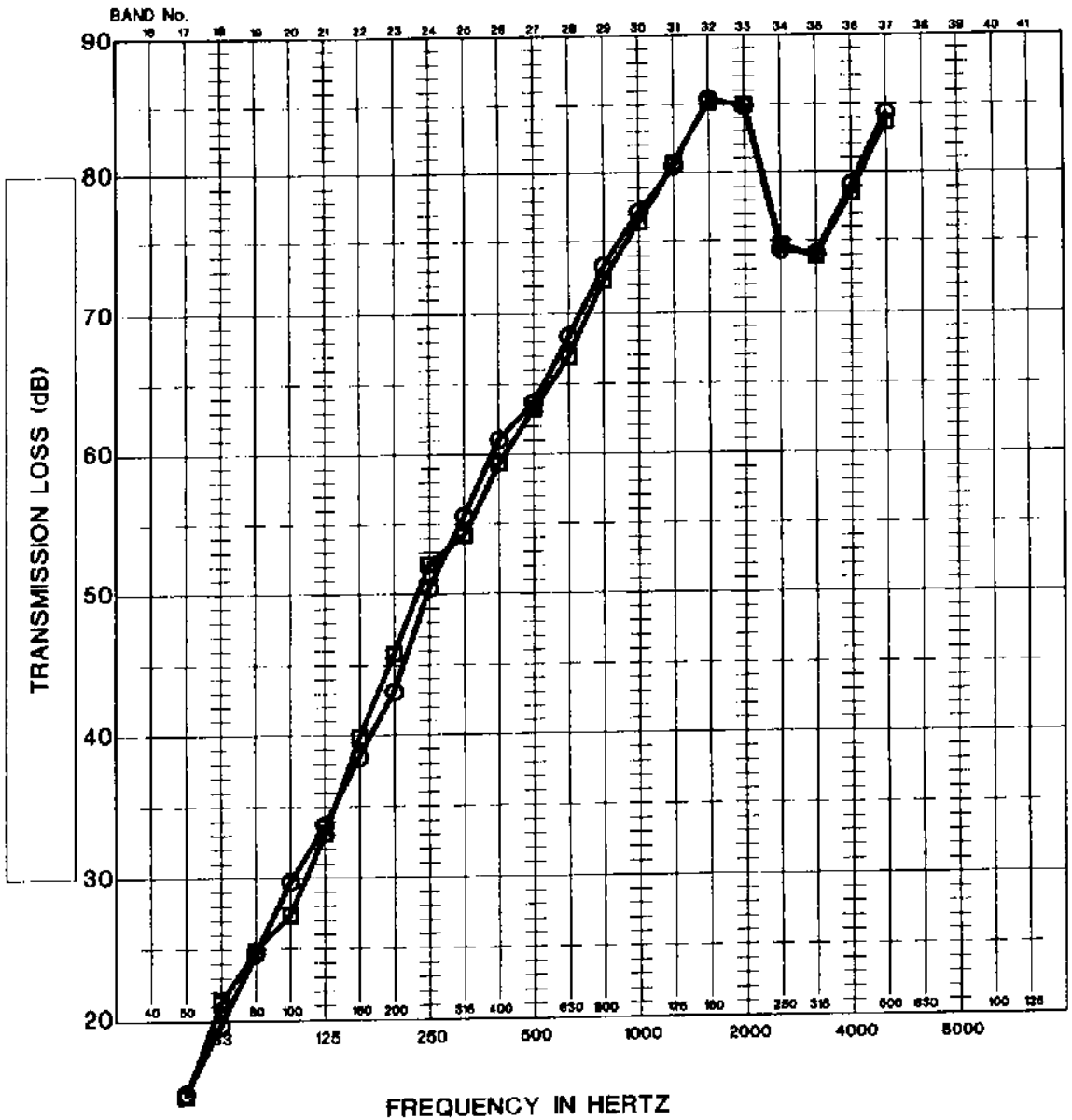
PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 71	**FILE NAME:** 177GRA071
PROJECT NUMBER 177011	**DATE** 2001 12

mjm

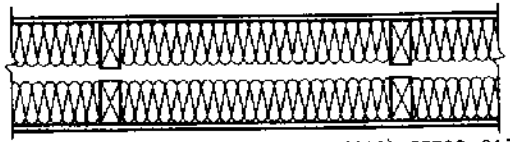
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

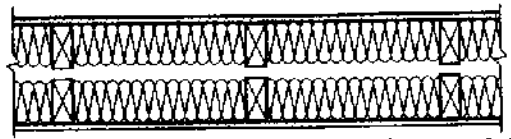
DOUBLE WOOD STUDS
13 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

WOOD STUDS @ 610mm (STC 57)



G13_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G13
(TL-93-288)

WOOD STUDS @ 406mm (STC 58)



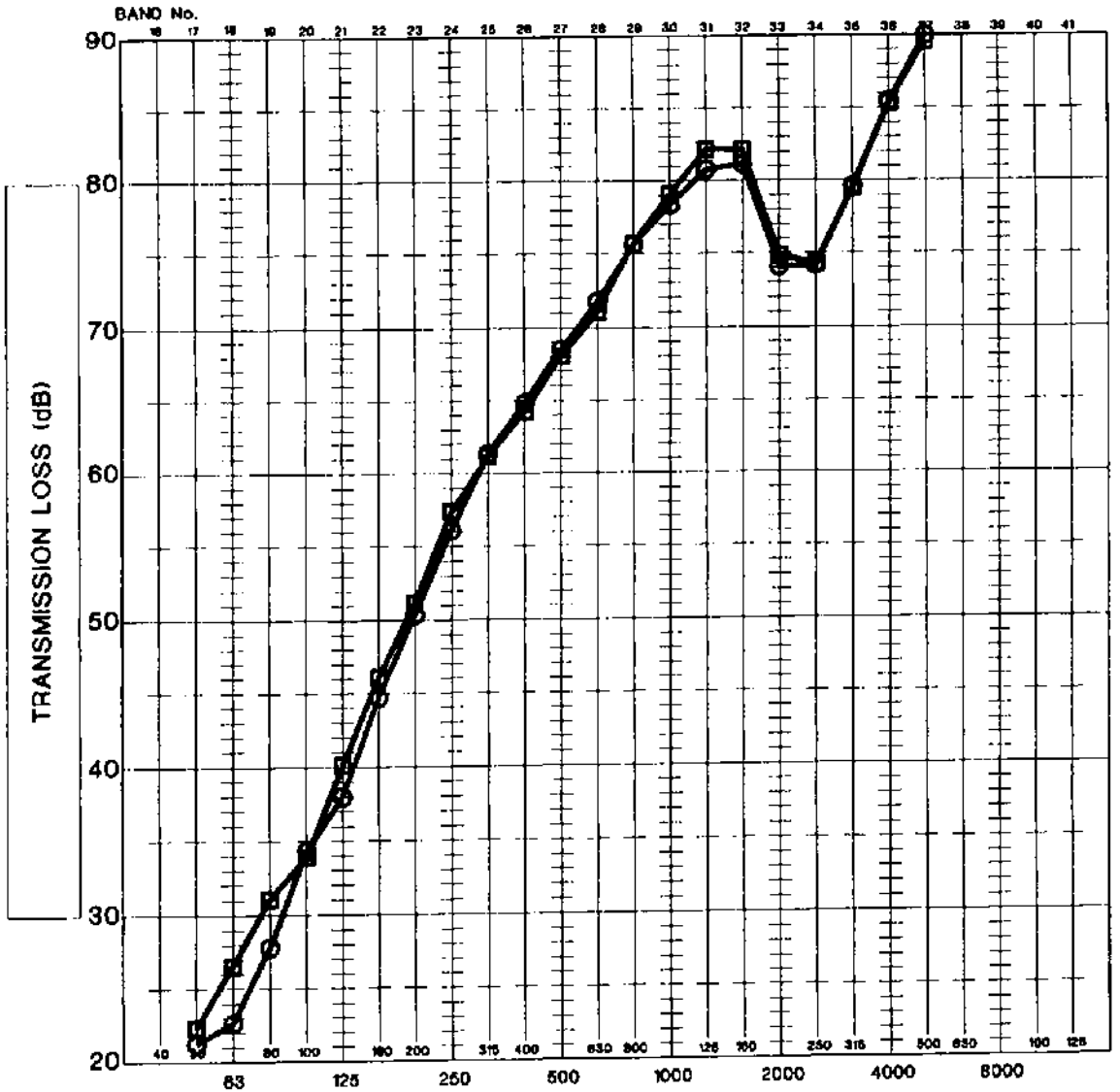
G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G13
(TL-93-270)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 72	**FILE NAME:** 177GRA072
PROJECT NUMBER 177.011	**DATE** 2001 12

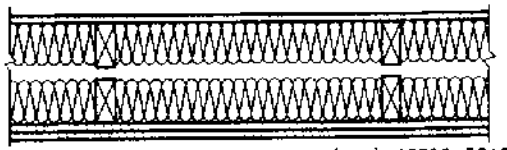
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

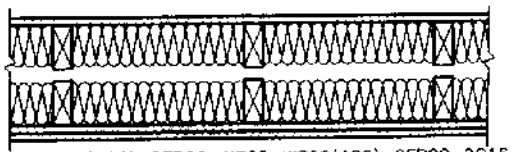
DOUBLE WOOD STUDS
GLASS FIBER INSULATION (G1)
16mm TYPE 'X' GYPSUM BOARDS

STUD SPACING = 610mm (STC 64)



G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_2G16
(TL-93-282)

STUD SPACING = 406mm (STC 62)



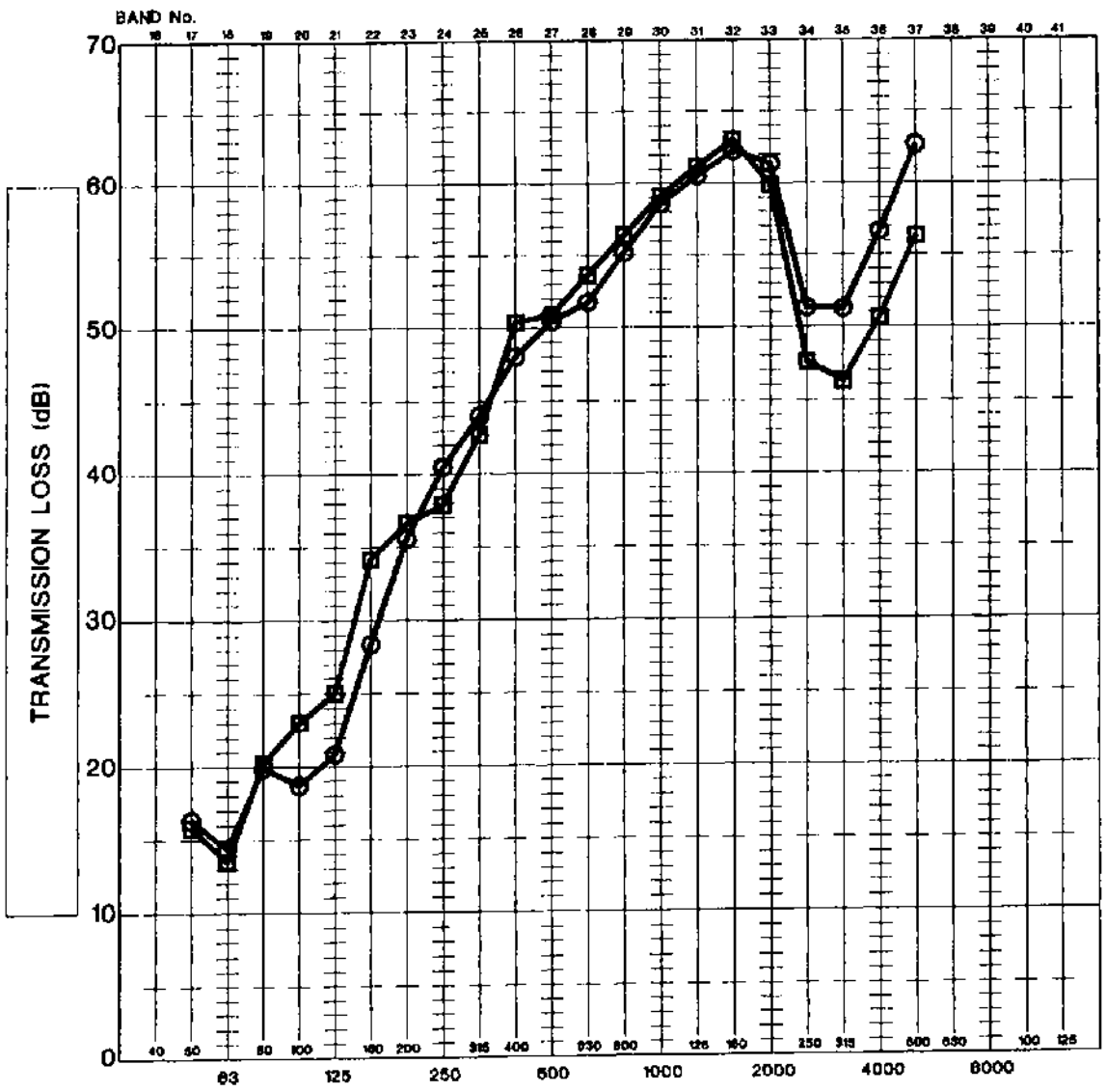
G16_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_2G16
(TL-93-267)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 73	**FILE NAME** 177GRA073
PROJECT NUMBER 177 011	**DATE** 2001 12

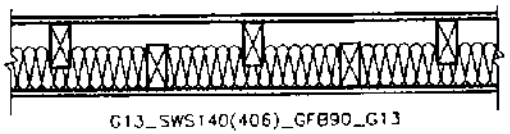
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

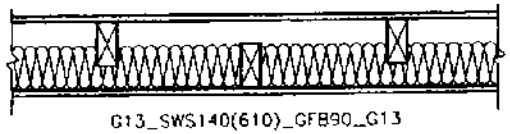
STAGGERED WOOD STUDS
13 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

WOOD STUDS @ 406mm (STC 45)



G13_SWS140(406)_GFB90_G13
(TL-93-098)

WOOD STUDS @ 610mm (STC 49)



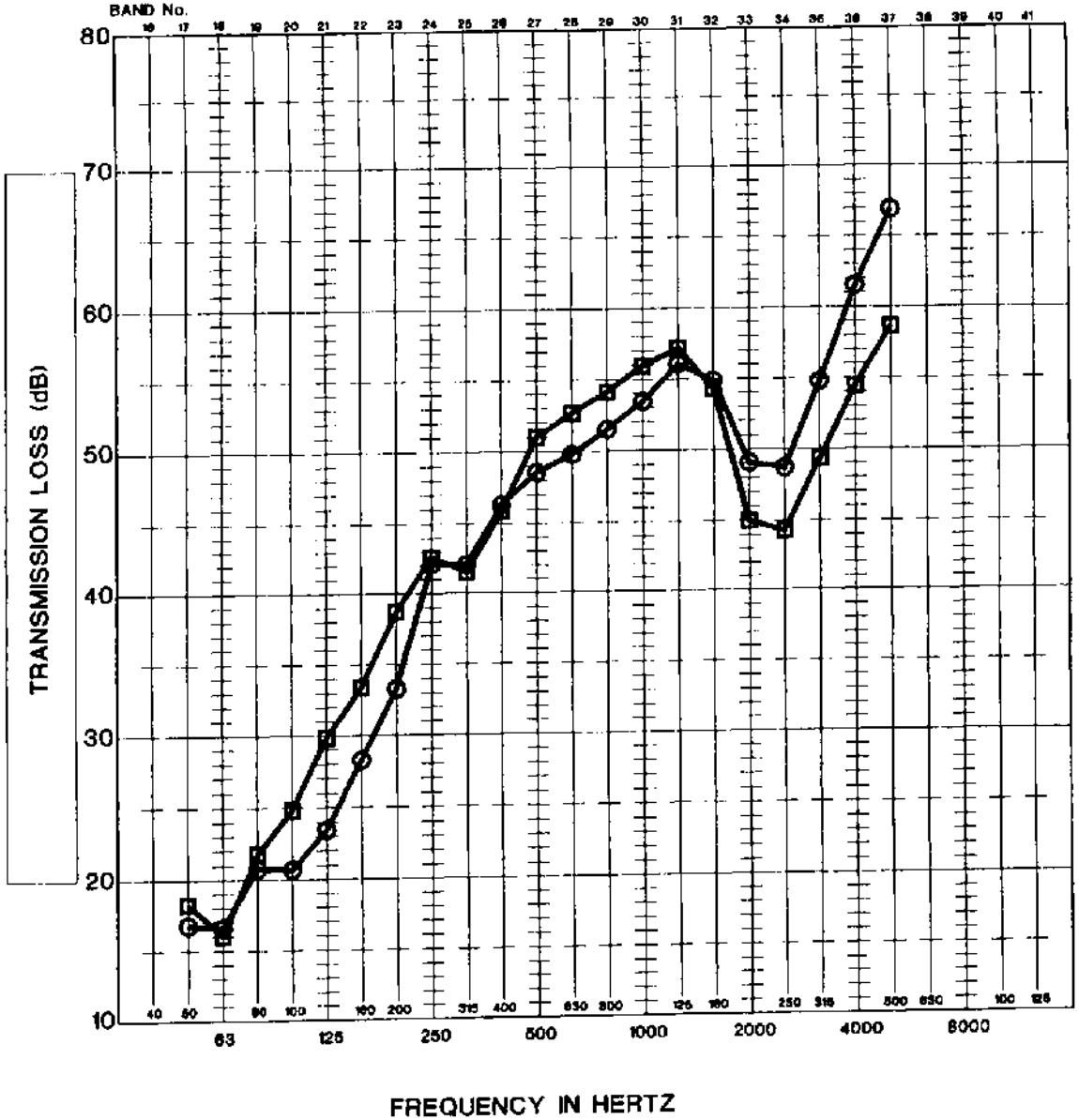
G13_SWS140(610)_GFB90_G13
(TL-93-117)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 74	**FILE NAME:** 177GRA074
PROJECT NUMBER 177.011	**DATE** 2001 12

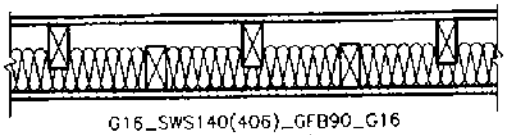
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

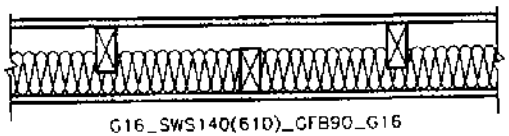
STAGGERED WOOD STUDS
16mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 47)
WOOD STUDS @ 406mm



G16_SWS140(406)_GFB90_G16
(TL-93-225)

(STC 48)
WOOD STUDS @ 610mm



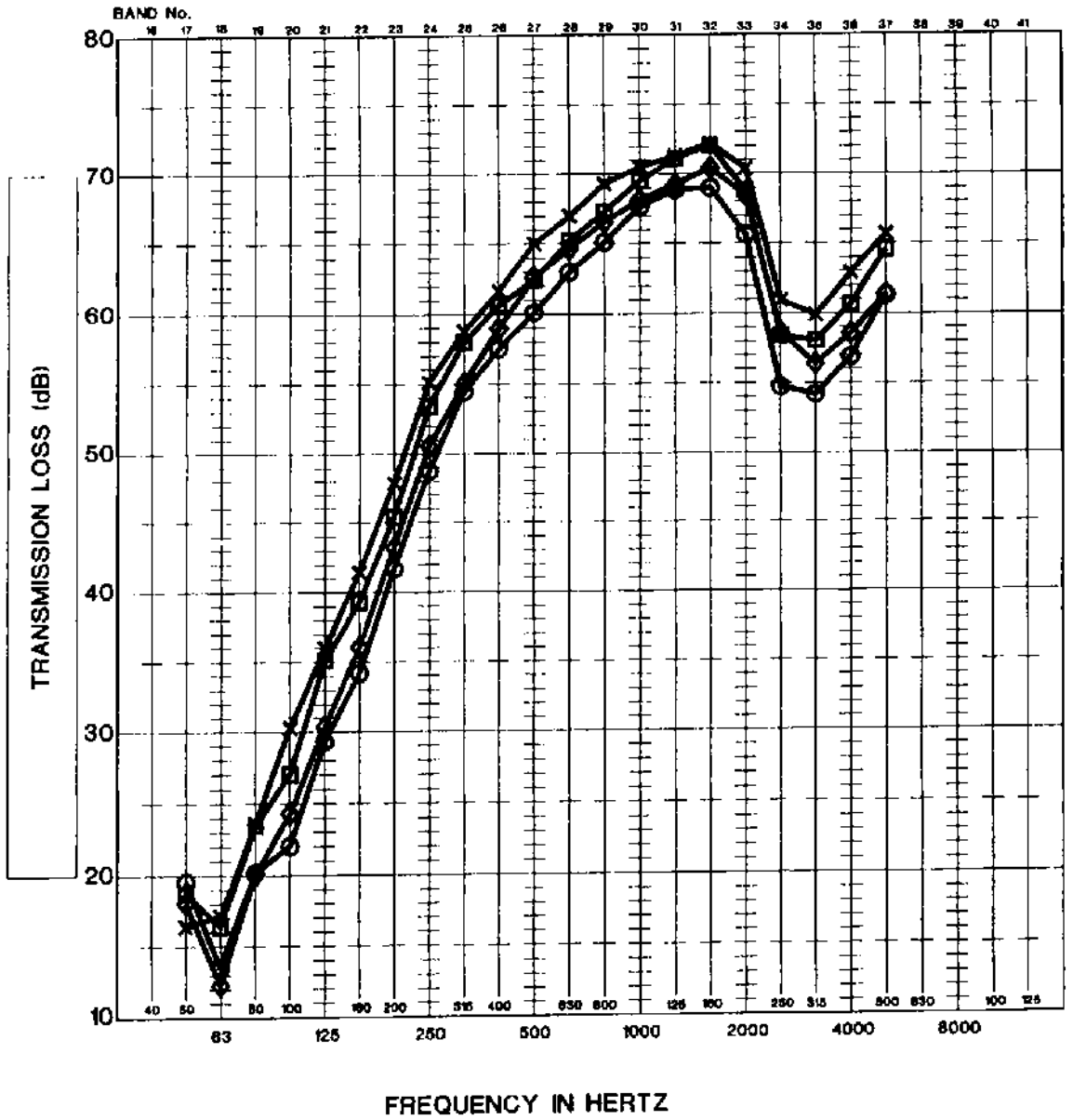
G16_SWS140(610)_GFB90_G16
(TL-93-256)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING STUD SPACING

GRAPH NUMBER 75	**FILE NAME** 177GRA075
PROJECT NUMBER 177 011	**DATE** 2001 12

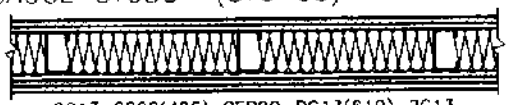
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
13 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

20 GAUGE STUDS (STC 60)

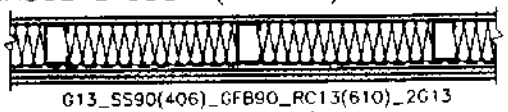


2G13_SS90(406)_GFB90_RC13(610)_2G13
(TL-94-020)

16 GAUGE STUDS (STC 59)

2G13_SS90(406)_GFB90_RC13(610)_2G13
(TL-94-017)

20 GAUGE STUDS (STC 54)



G13_SS90(406)_GFB90_RC13(610)_2G13
(TL-94-021)

16 GAUGE STUDS (STC 53)

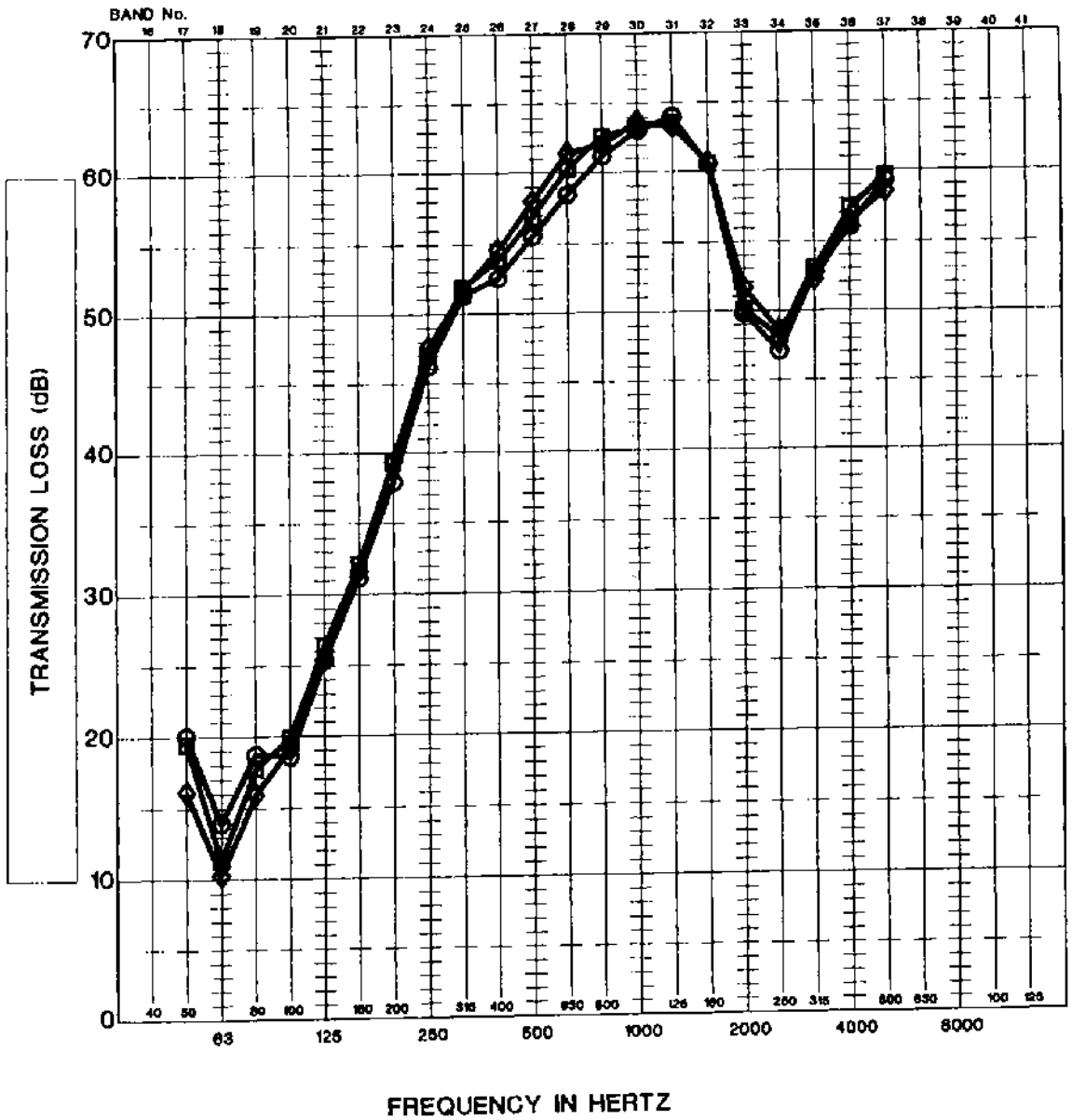
G13_SS90(406)_GFB90_RC13(610)_2G13
(TL-94-018)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF CHANGING STEEL STUD GAUGE

GRAPH NUMBER 76	**FILE NAME** 177GRA076
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

18 GAUGE STUDS (STC 50)

G16_SS90(406)_GFB90_RC13(610)_G16
(TL-93-354)

20 GAUGE STUDS (STC 49)

G16_SS90(406)_GFB90_RC13(610)_G16
(TL-94-025)

16 GAUGE STUDS (STC 49)

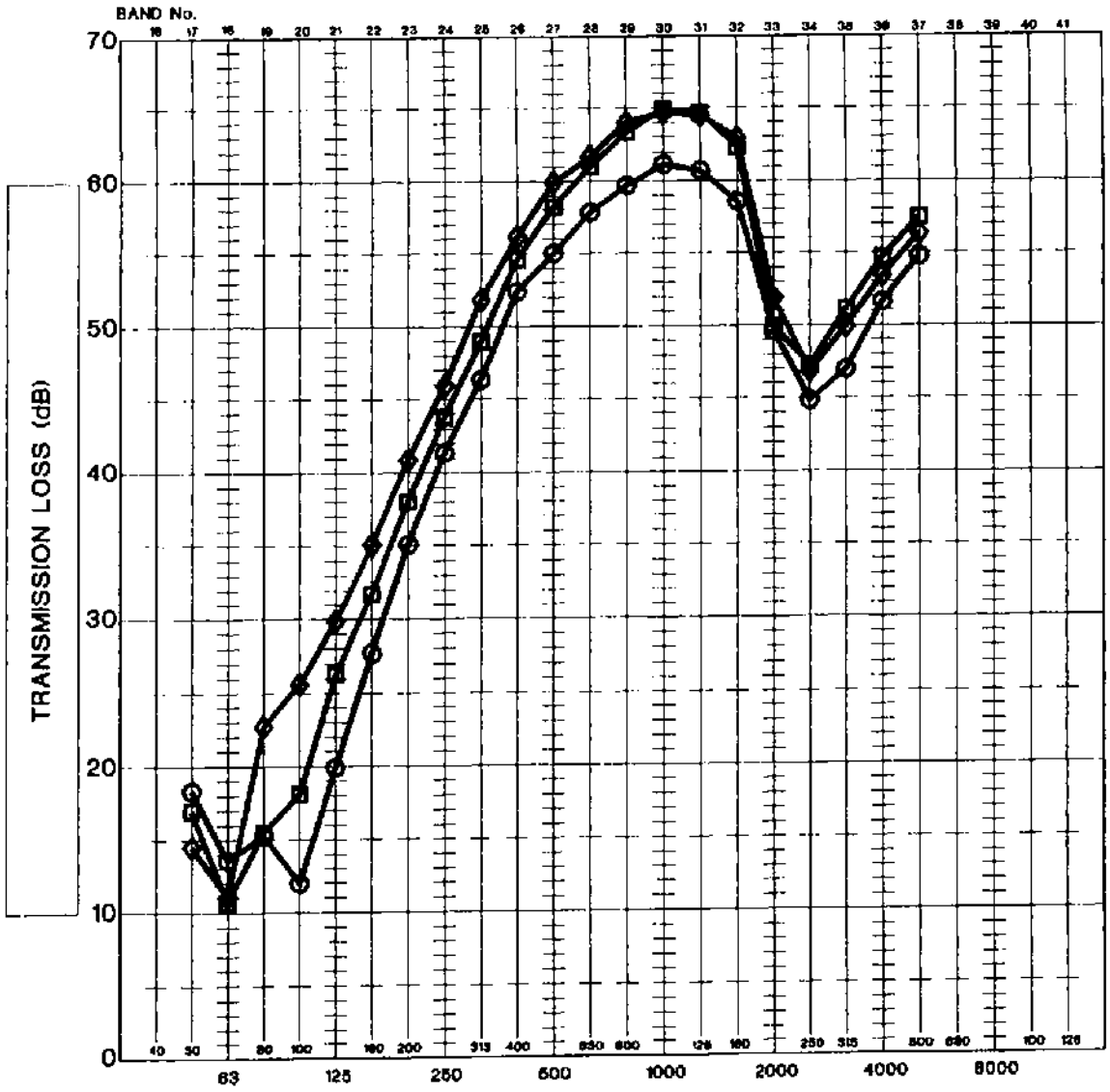
G16_SS90(406)_GFB90_RC13(610)_G16
(TL-93-355)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF CHANGING STEEL STUD GAUGE

GRAPH NUMBER 77	**FILE NAME** 177GRA077
PROJECT NUMBER 177.011	**DATE** 2001 12

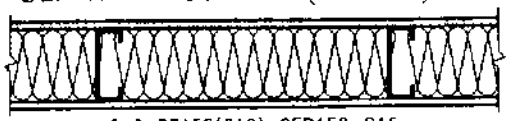
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

STUD DEPTH = 150mm (STC 51)



G16_SS150(610)_GFB150_G16
(TL-93-298)

STUD DEPTH = 90mm (STC 50)

G16_SS90(610)_GFB90_G16
(TL-93-324)

STUD DEPTH = 65mm (STC 44)

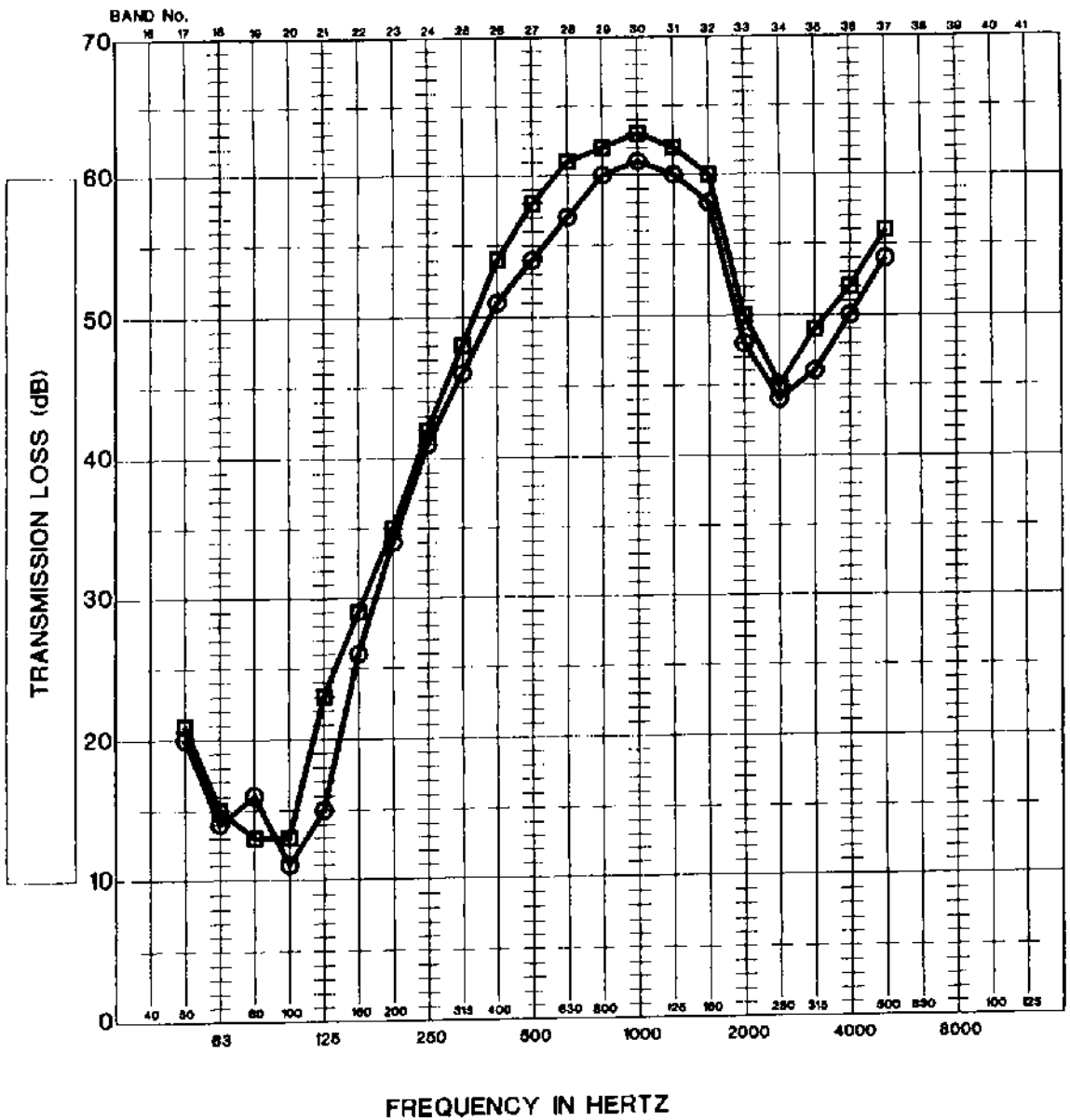
G16_SS65(610)_GBF65_G16
(TL-93-033)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF CHANGING STEEL STUD DEPTH

GRAPH NUMBER 78	**FILE NAME** 177GRA078
PROJECT NUMBER 177.011	**DATE** 2001_12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
16mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

90mm STEEL STUDS

G16_SS90(406)_GFB90_G16
(TL-92-419)

65mm STEEL STUDS

G16_SS65(406)_GFB65_G16
(TL-93-058)

PROJECT DESCRIPTION

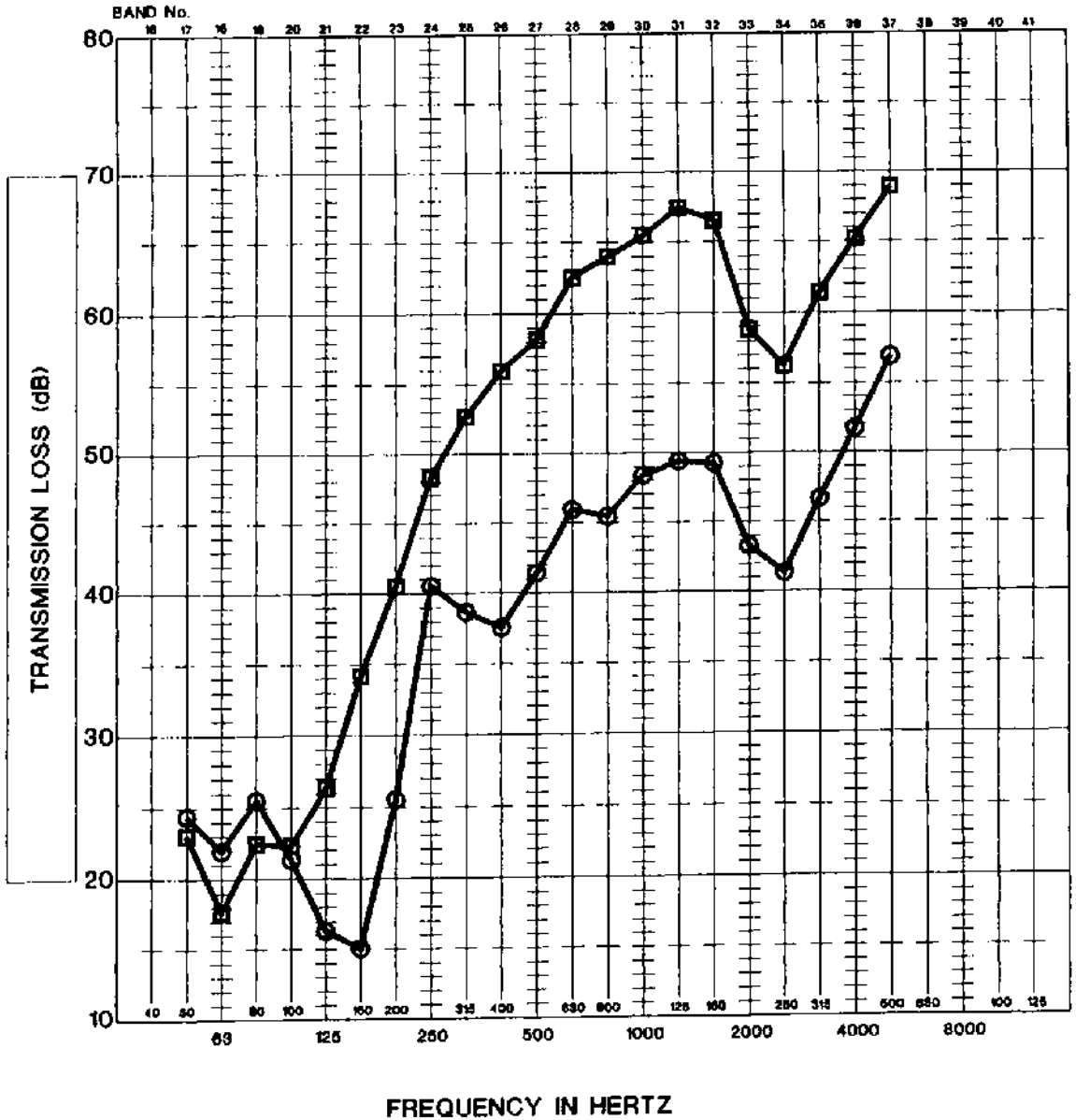
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF CHANGING STUDS STEEL STUD DEPTH

GRAPH NUMBER 79	**FILE NAME** 177GRA079
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
MINERAL FIBER INSULATION (M1)

(STC 50)
RESILIENT CHANNELS ON ONE SIDE

G16_WS90(406)_MFB90_RC13(610)_2G16
(TL-93-155)

(STC 36)
NO RESILIENT CHANNELS

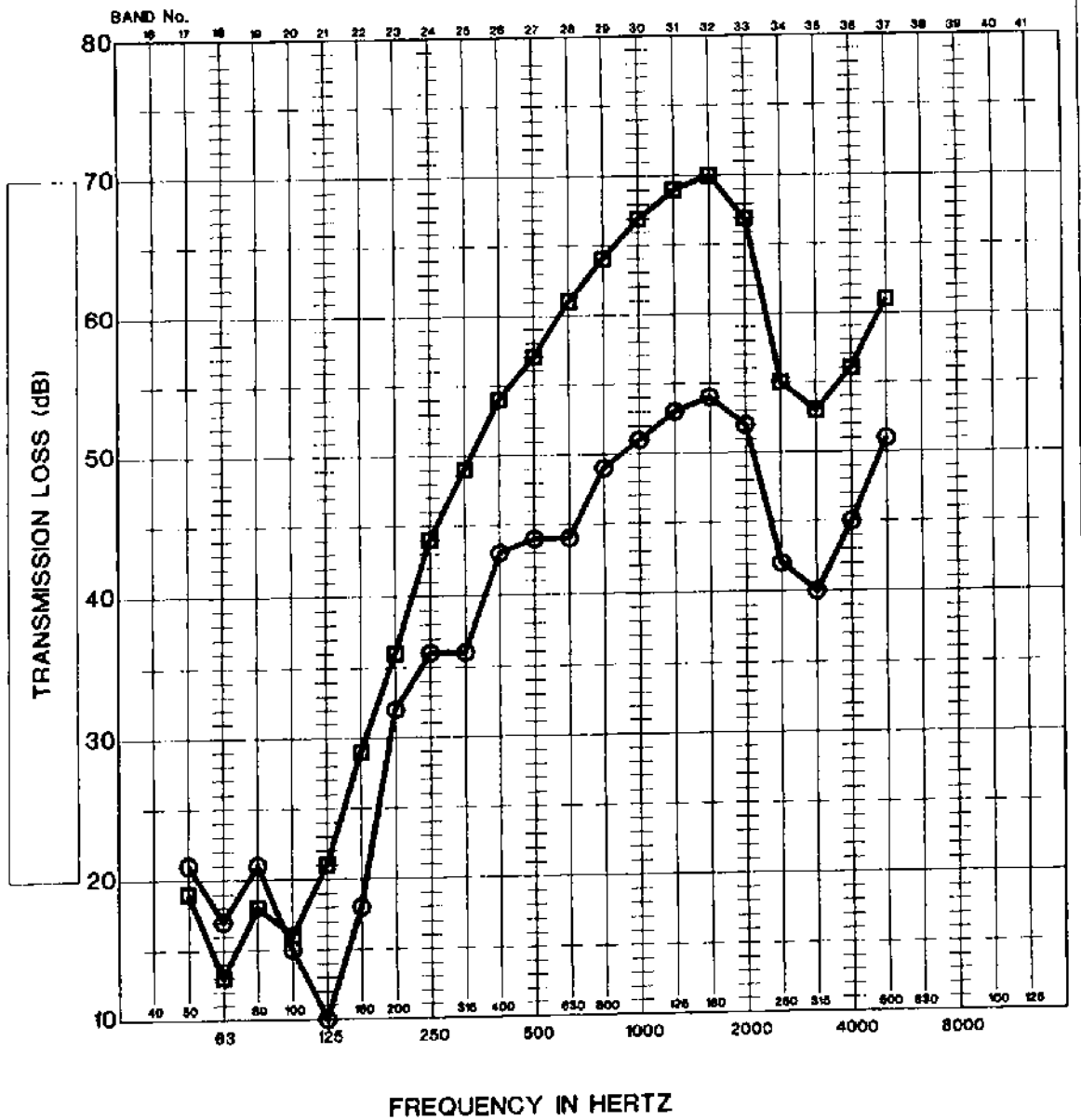
G16_WS90(406)_MFB90_2G16
(TL-93-158)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING RESILIENT FURRING CHANNELS

GRAPH NUMBER 80	**FILE NAME:** 177GRA080
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



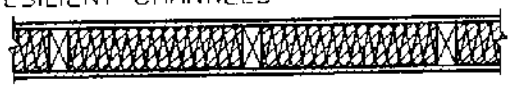
LEGEND

WOOD STUDS @ 406 mm
13 mm TYPE 'X' GYPSUM BOARDS
MINERAL FIBER INSULATION (M1)

(STC 45)
RESILIENT CHANNELS ON ONE SIDE

G13_WS90(406)_MFB90_RC13(610)_G13
(TL-93-185)

(STC 34)
NO RESILIENT CHANNELS



G13_WS90(406)_MFB90_G13
(TL-93-188)

PROJECT DESCRIPTION

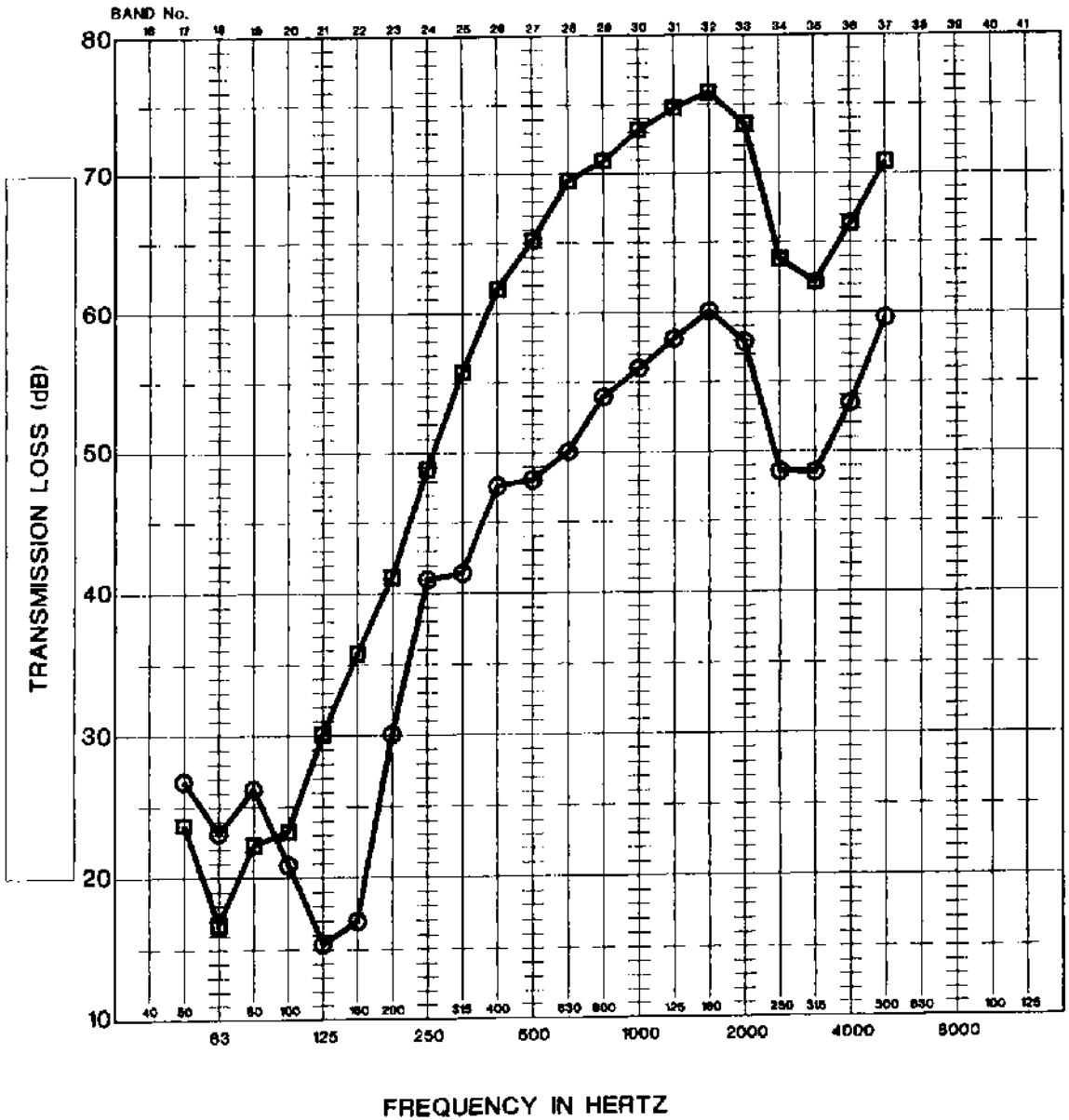
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING RESILIENT FURRING CHANNELS

GRAPH NUMBER 81	**FILE NAME** 177GRA081
PROJECT NUMBER 177011	**DATE** 2001 12

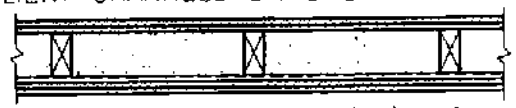
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
13mm TYPE 'X' GYPSUM BOARDS
BLOWN-IN CELLULOSE INSULATION (C2)

(STC 54)
RESILIENT CHANNELS ON ONE SIDE



2G13_WS90(406)_CFL90_RC13(610)_2G13
(TL-93-173)

(STC 38)
NO RESILIENT CHANNELS

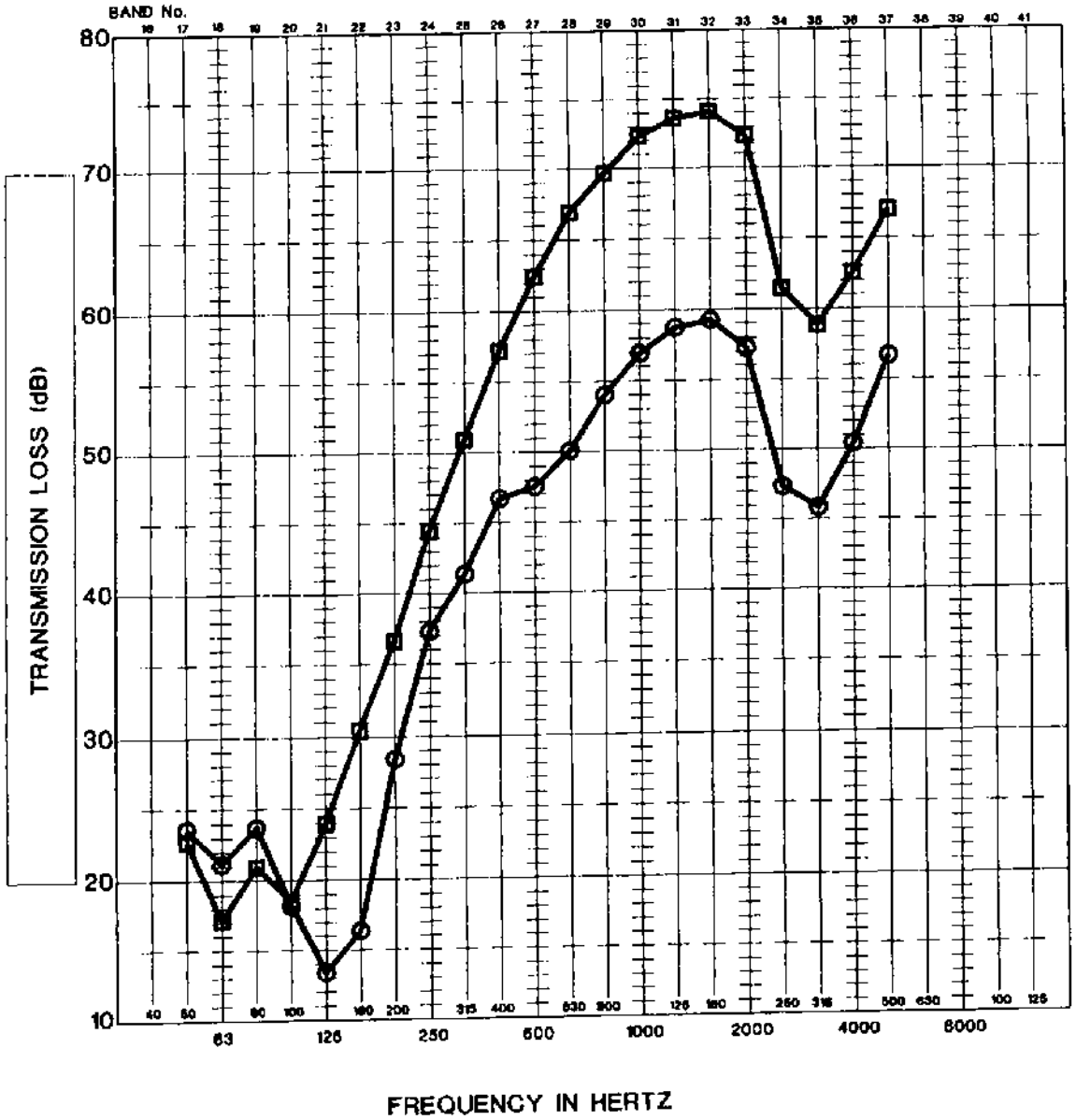
2G13_WS90(406)_CFL90_2G13
(TL-93-174)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING RESILIENT FURRING CHANNELS

GRAPH NUMBER 82	**FILE NAME:** 177GRA082
PROJECT NUMBER 177.011	**DATE** 2001 12

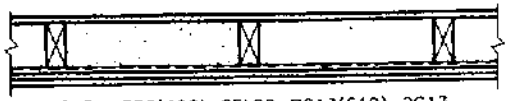
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

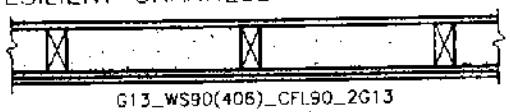
WOOD STUDS @ 406 mm
13mm TYPE 'X' GYPSUM BOARDS
BLOWN-IN CELLULOSE INSULATION (C2)

(STC 48)
RESILIENT CHANNELS ON ONE SIDE



G13_WS90(406)_CFL90_RC13(610)_2G13
(TL-93-172)

(STC 37)
NO RESILIENT CHANNELS



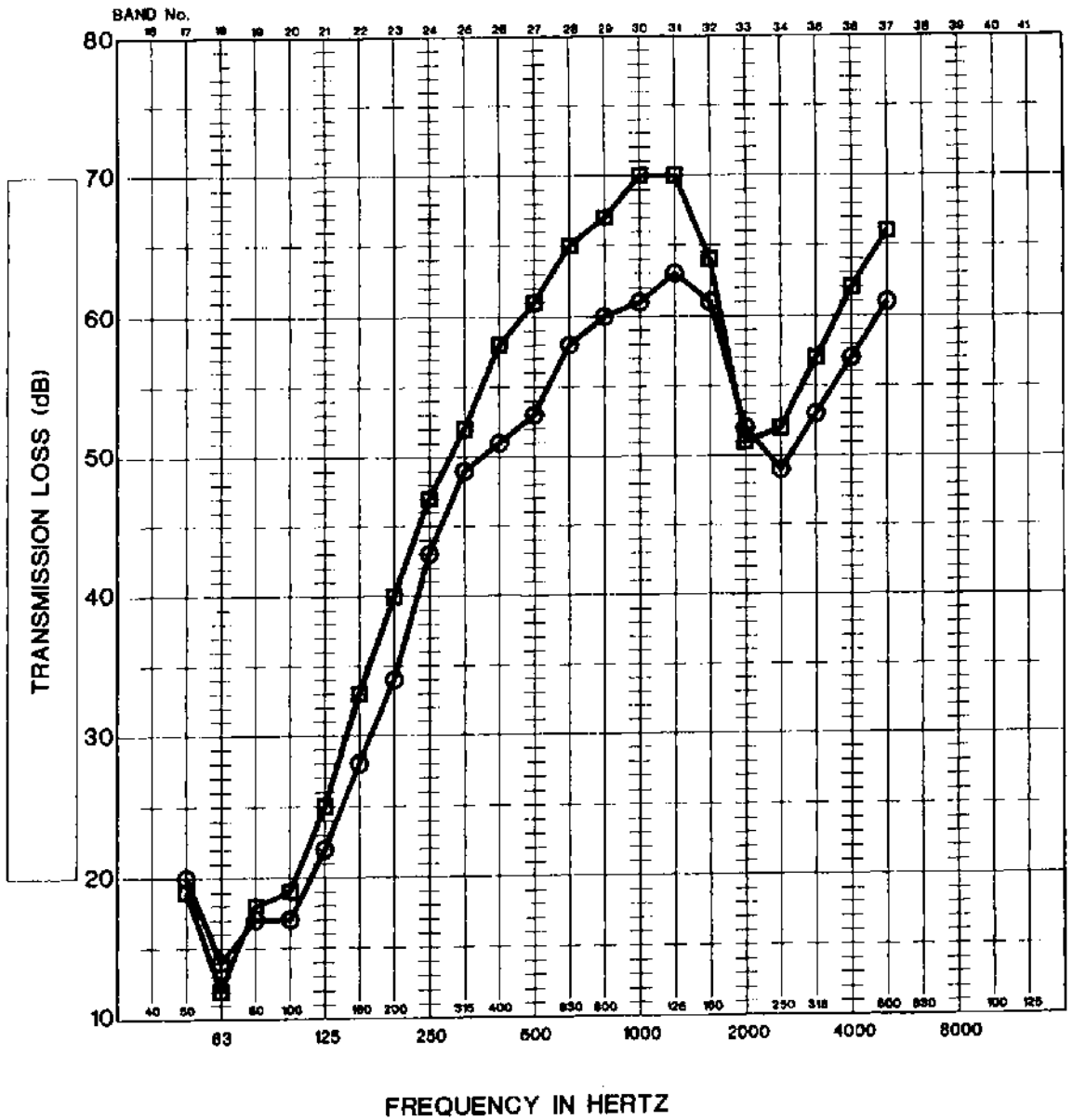
G13_WS90(406)_CFL90_2G13
(TL-93-175)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING RESILIENT FURRING CHANNELS

GRAPH NUMBER 83	**FILE NAME:** 177GRA083
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

(STC 49)
WITH RESILIENT CHANNELS ON BOTH SIDES OF THE PARTITION

G16_RC13(610)_WS90(406)_GFB90_RC13(610)_G16
(TL-93-159)

(STC 46)
WITH RESILIENT CHANNELS ON ONE SIDE OF THE PARTITION

G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-113)

PROJECT DESCRIPTION

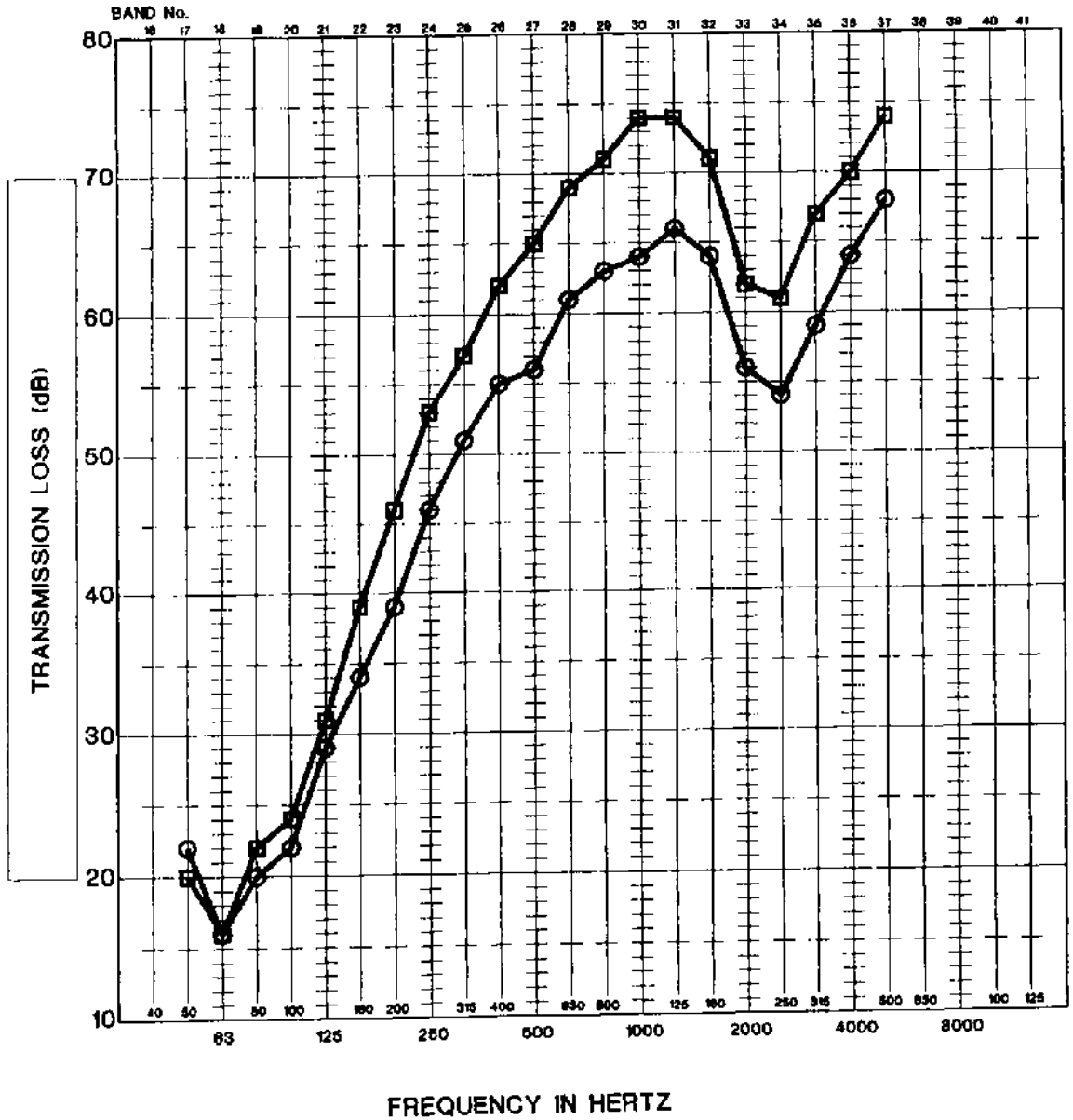
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING RESILIENT CHANNELS

GRAPH NUMBER 84	**FILE NAME** 177GRA084
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

(STC 55)
RESILIENT CHANNELS ON BOTH SIDES

G16_RC13(610), WS90(406)_GFB90_RC13(610)_2G16
(TL-93-160)

(STC 53)
RESILIENT CHANNELS ON ONE SIDE

G16_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-114)

PROJECT DESCRIPTION

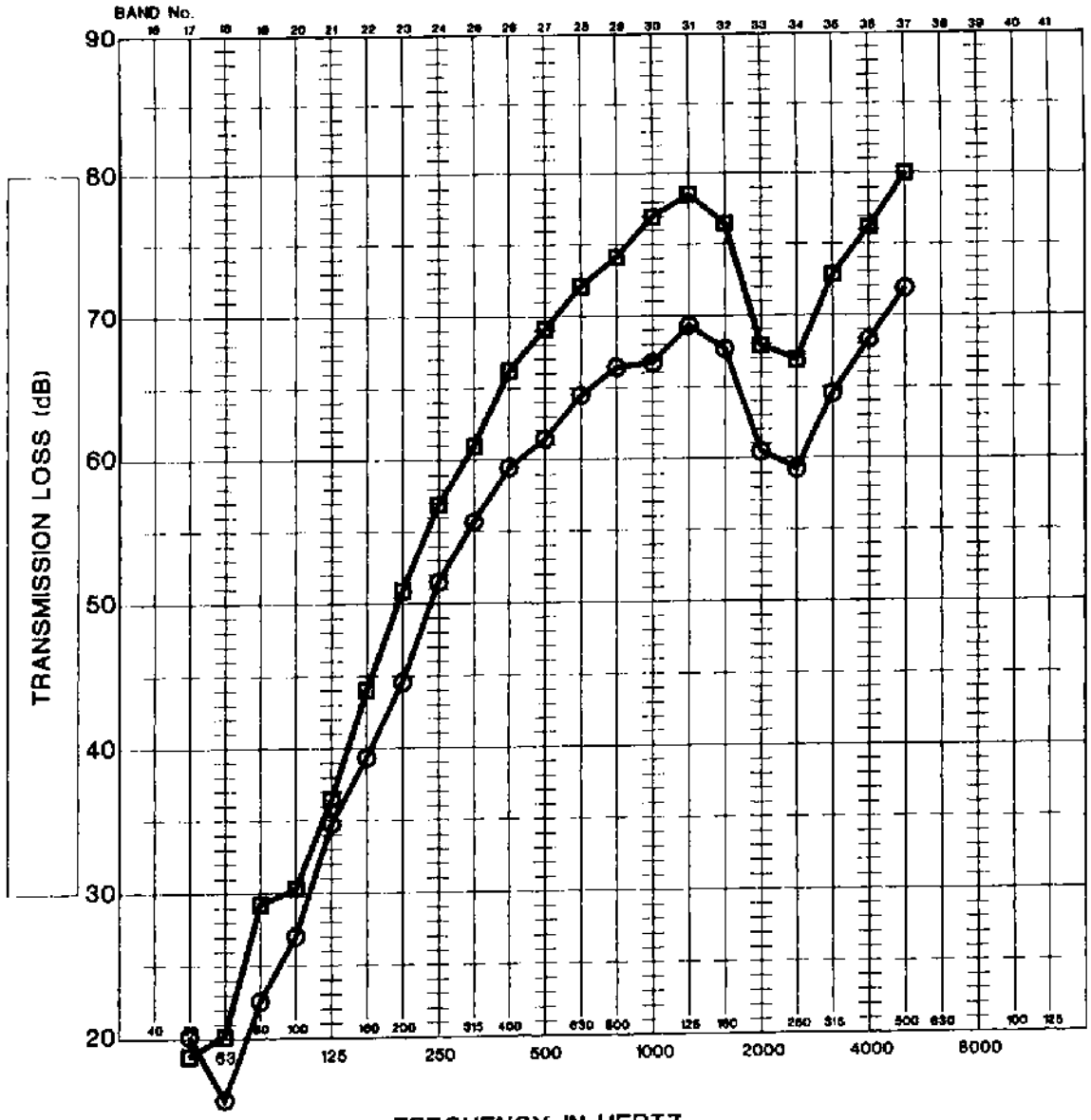
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING RESILIENT CHANNELS

GRAPH NUMBER 85	**FILE NAME** 177GRA085
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE "X" GYPSUM BOARD
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

(STC 60)
RESILIENT CHANNELS ON BOTH SIDES

2G16_RC13(610)_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-161)

(STC 59)
RESILIENT CHANNELS ON ONE SIDE

2G16_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-115)

PROJECT DESCRIPTION

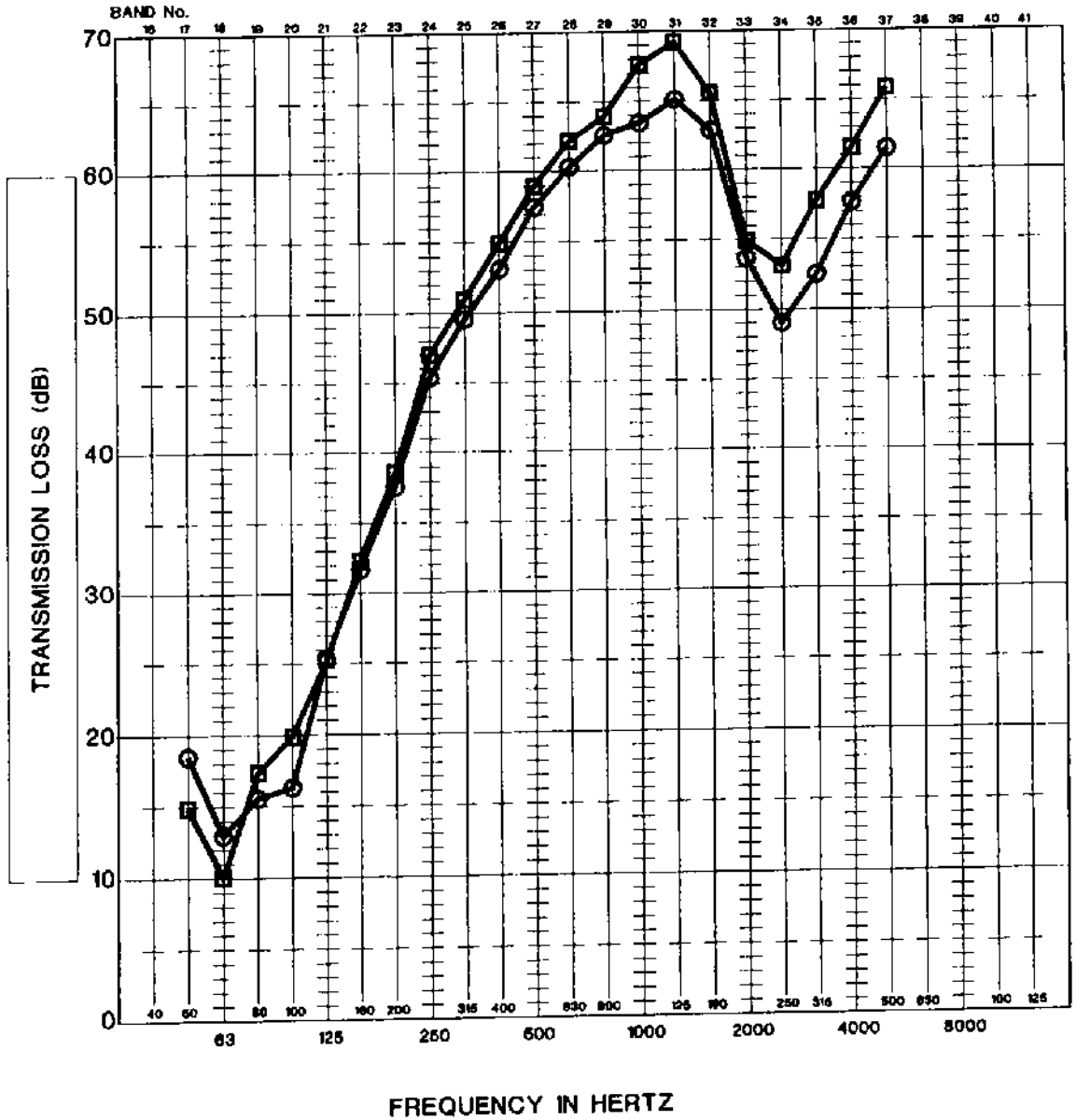
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSENBLIES

GRAPH TITLE

EFFECT OF ADDING A SECOND RESILIENT CHANNEL

GRAPH NUMBER 86	**FILE NAME** 177GRA086
PROJECT NUMBER 177.011	**DATE** 2001 12

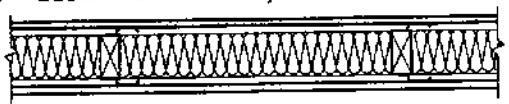
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 610 mm
16 mm TYPE "X" GYPSUM BOARD
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

□——□ (STC 49)
RESILIENT CHANNELS ON BOTH SIDES
(INSTALLED VERTICALLY)



G16_RC13(610)_WS90(610)_GFB90_RC13(610)_G16
(TL-93-104)

○——○ (STC 49)
RESILIENT CHANNELS ON ONE SIDE
(INSTALLED HORIZONTALLY)

G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-083)

PROJECT DESCRIPTION

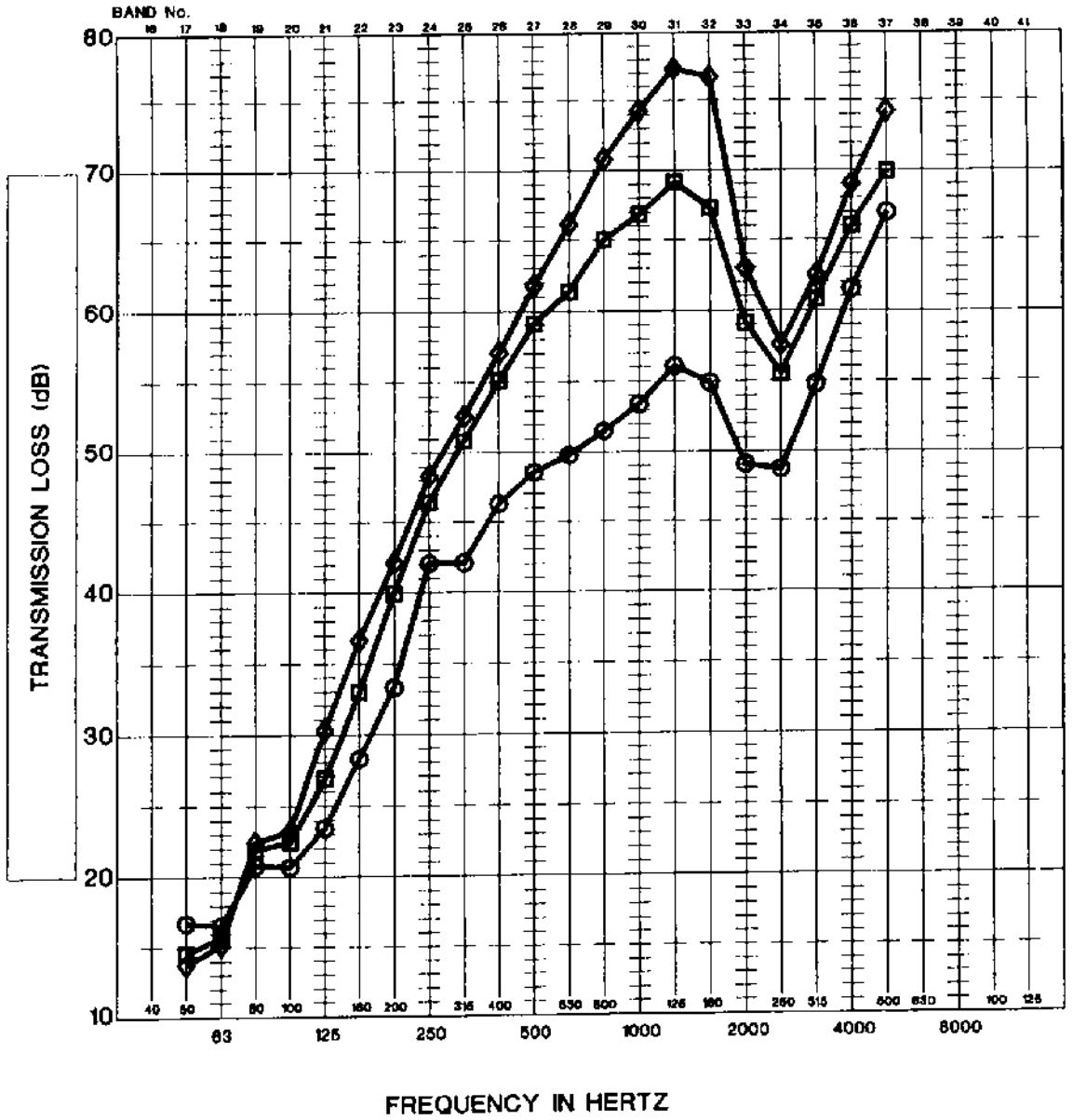
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECT OF ADDING A SECOND RESILIENT CHANNEL

GRAPH NUMBER 87	**FILE NAME** 177GRA087
PROJECT NUMBER 177.011	**DATE** 2001 12

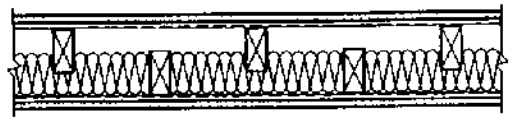
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STAGGERED WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

◇——◇ (STC 54)
RESILIENT CHANNELS ON BOTH SIDES

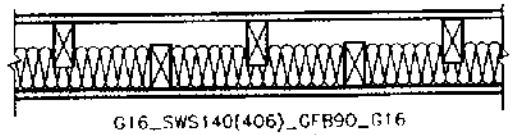


G16_RC13(610)_SWS140(406)_GBF90_RC13(610)_G16
(TL-93-223)

□——□ (STC 51)
RESILIENT CHANNELS ON ONE SIDE

G16_SWS140(406)_GFB90_RC13(610)_G16
(TL-93-214)

○——○ (STC 47)
NO RESILIENT CHANNELS



G16_SWS140(406)_GFB90_G16
(TL-93-225)

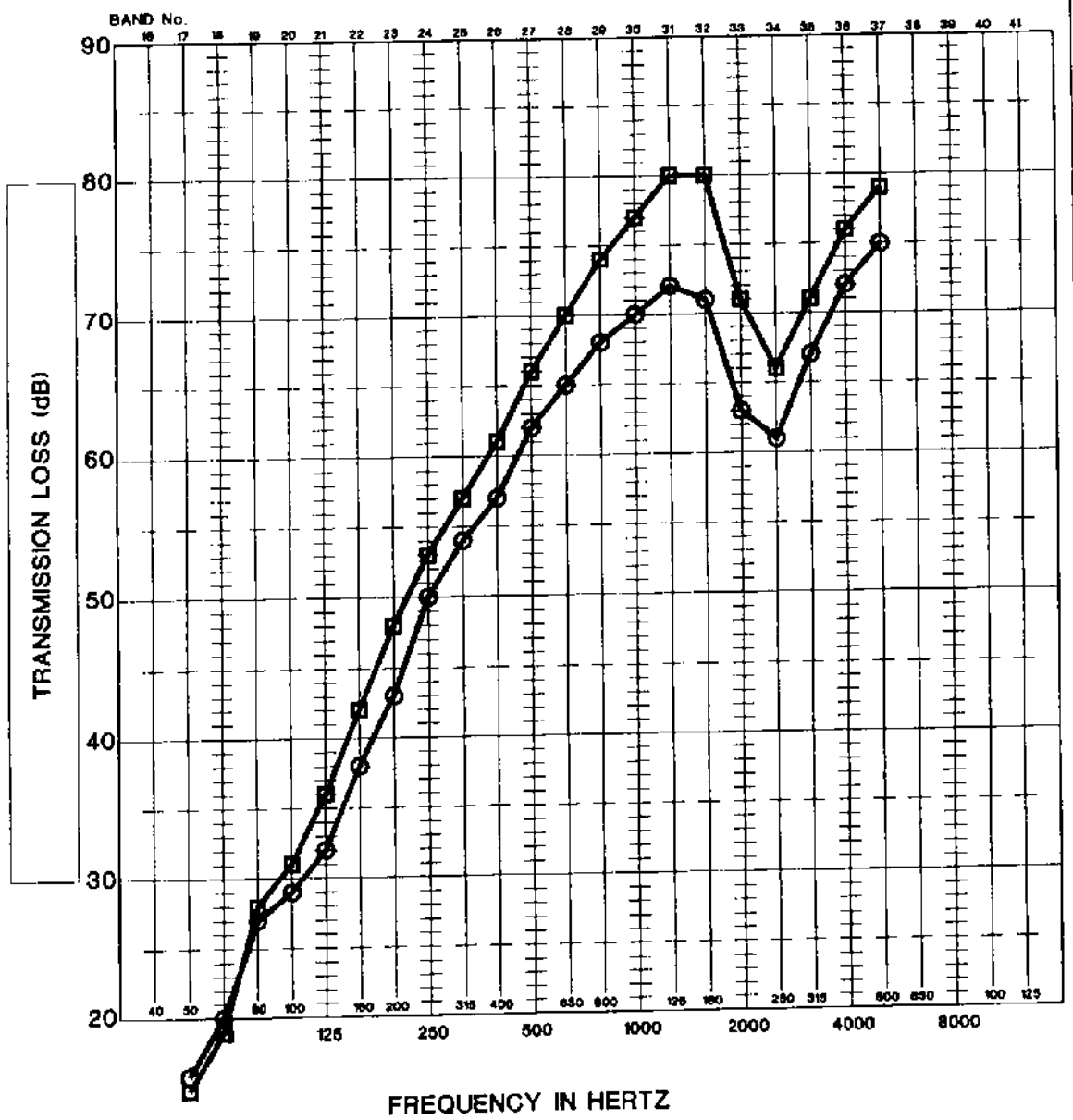
PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING RESILIENT FURRING CHANNELS

GRAPH NUMBER 88	**FILE NAME** 177GRA088
PROJECT NUMBER 177.011	**DATE** 2001 12

MJM

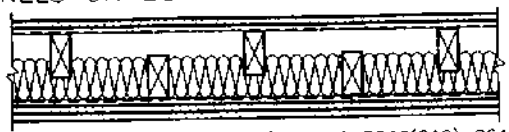
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

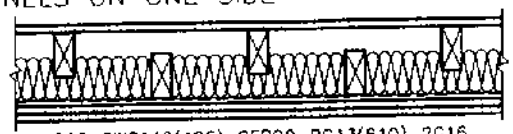
STAGGERED WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 60)
CHANNELS ON BOTH SIDES



G16_RC13(610)_SWS140(406)_GFB90_RC13(610)_2G16
(TL-93-222)

(STC 56)
CHANNELS ON ONE SIDE



G16_SWS140(406)_GFB90_RC13(610)_2G16
(TL-93-215)

PROJECT DESCRIPTION

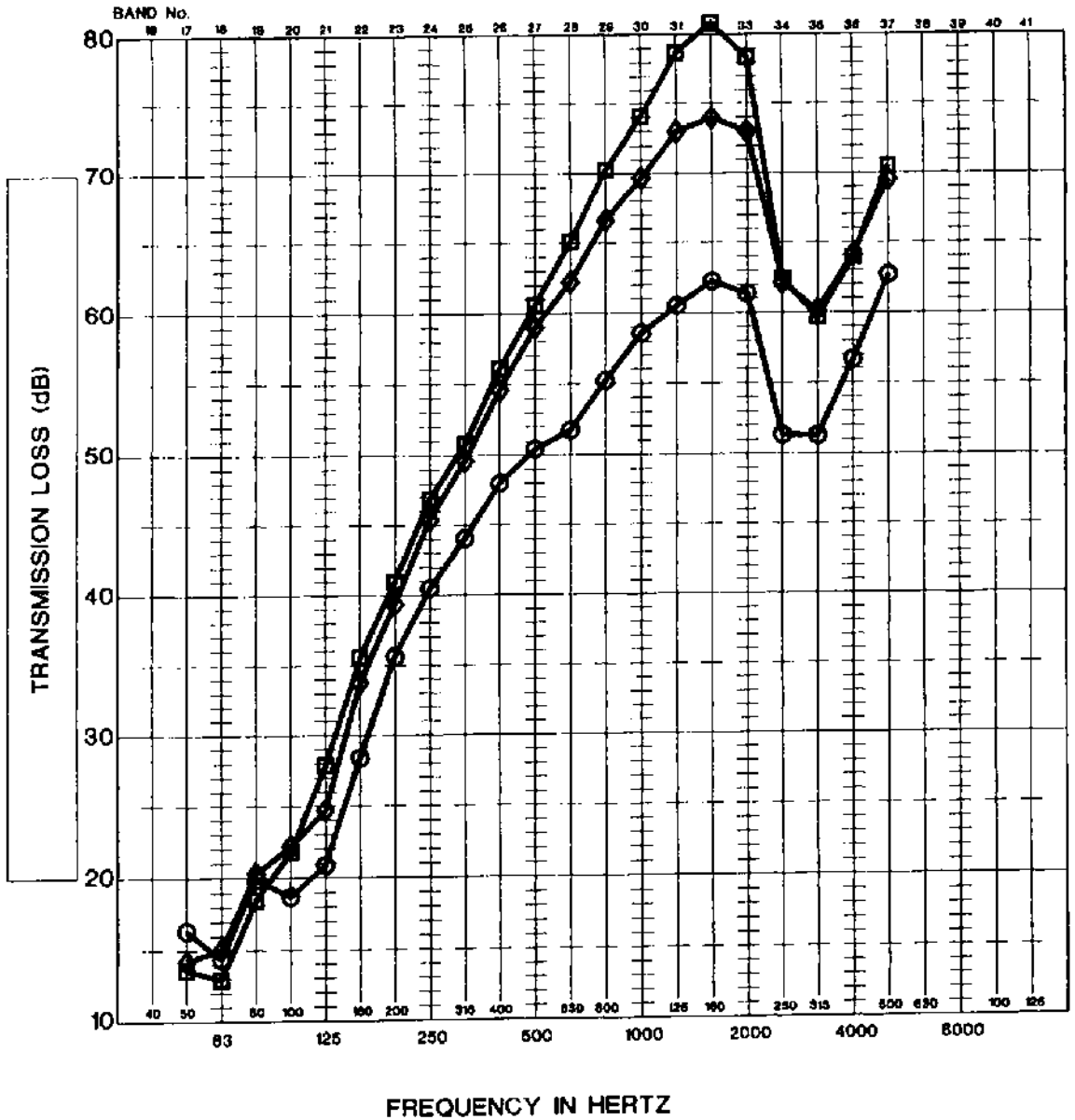
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING RESILIENT CHANNELS

GRAPH NUMBER 89	**FILE NAME:** 177GRA089
PROJECT NUMBER 177.011	**DATE** 2001 12

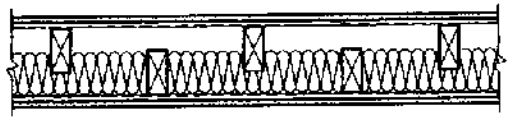
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

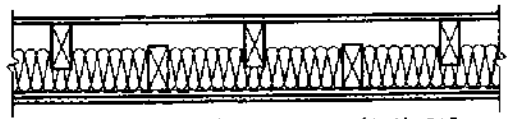
STAGGERED WOOD STUDS @ 406 mm
13 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 52)
RESILIENT CHANNELS ON BOTH SIDES



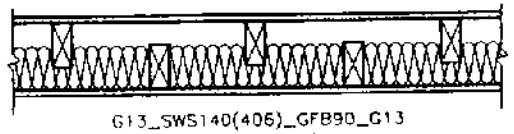
G13_RC13(610)_SWS140(406)_GBF90_RC13(610)_G13
(TL-93-224)

(STC 49)
RESILIENT CHANNELS ON ONE SIDE



G13_SWS140(406)_GFB90_RC13(610)_G13
(TL-93-213)

(STC 45)
NO RESILIENT CHANNELS



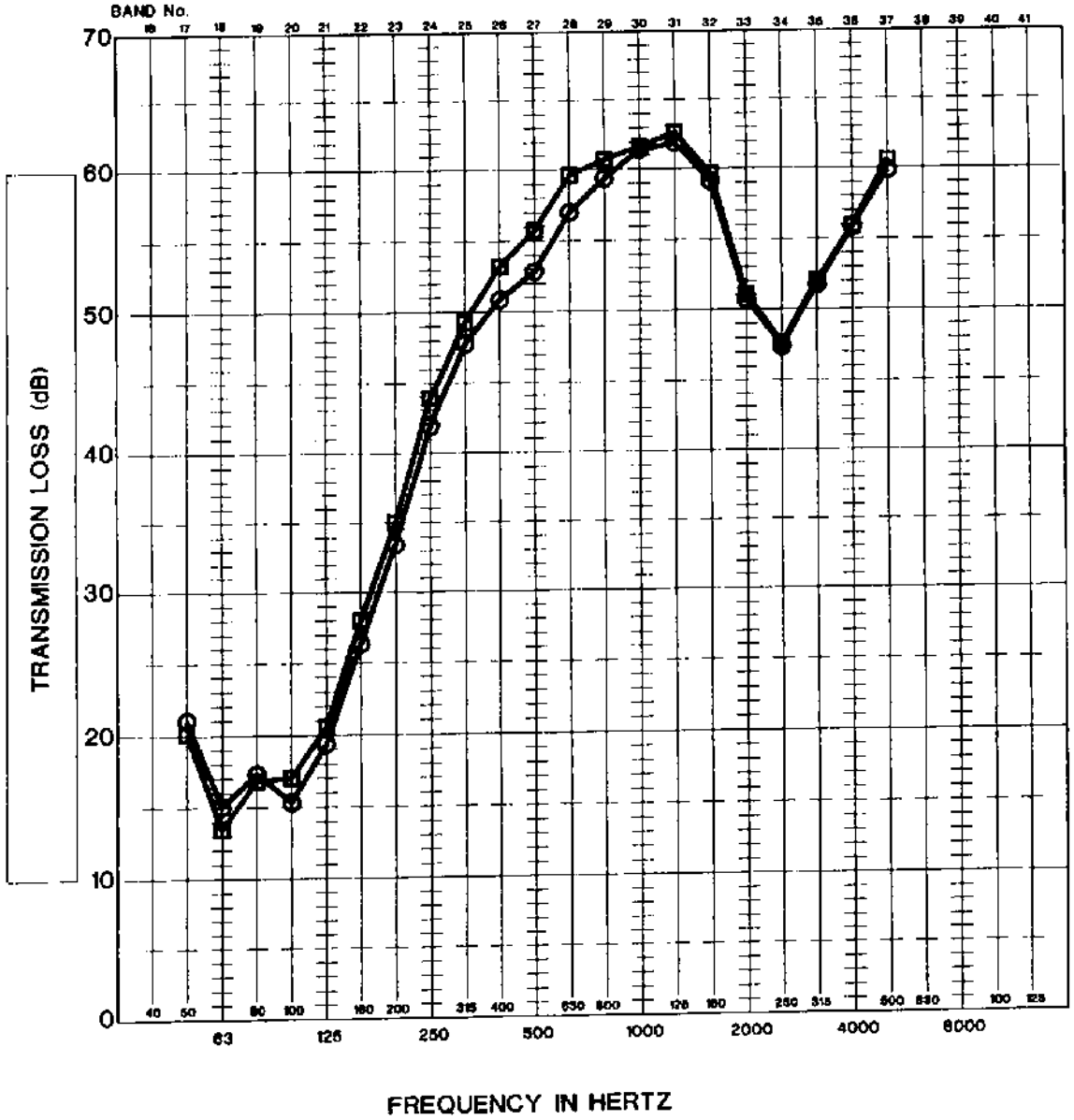
G13_SWS140(406)_GFB90_G13
(TL-93-208)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF ADDING RESILIENT FURRING CHANNELS

GRAPH NUMBER 90	**FILE NAME** 177GRA090
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

□——□ (STC 45)
RESILIENT CHANNEL SPACING @ 610 mm

G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-109)

○——○ (STC 43)
RESILIENT CHANNEL SPACING @ 406 mm

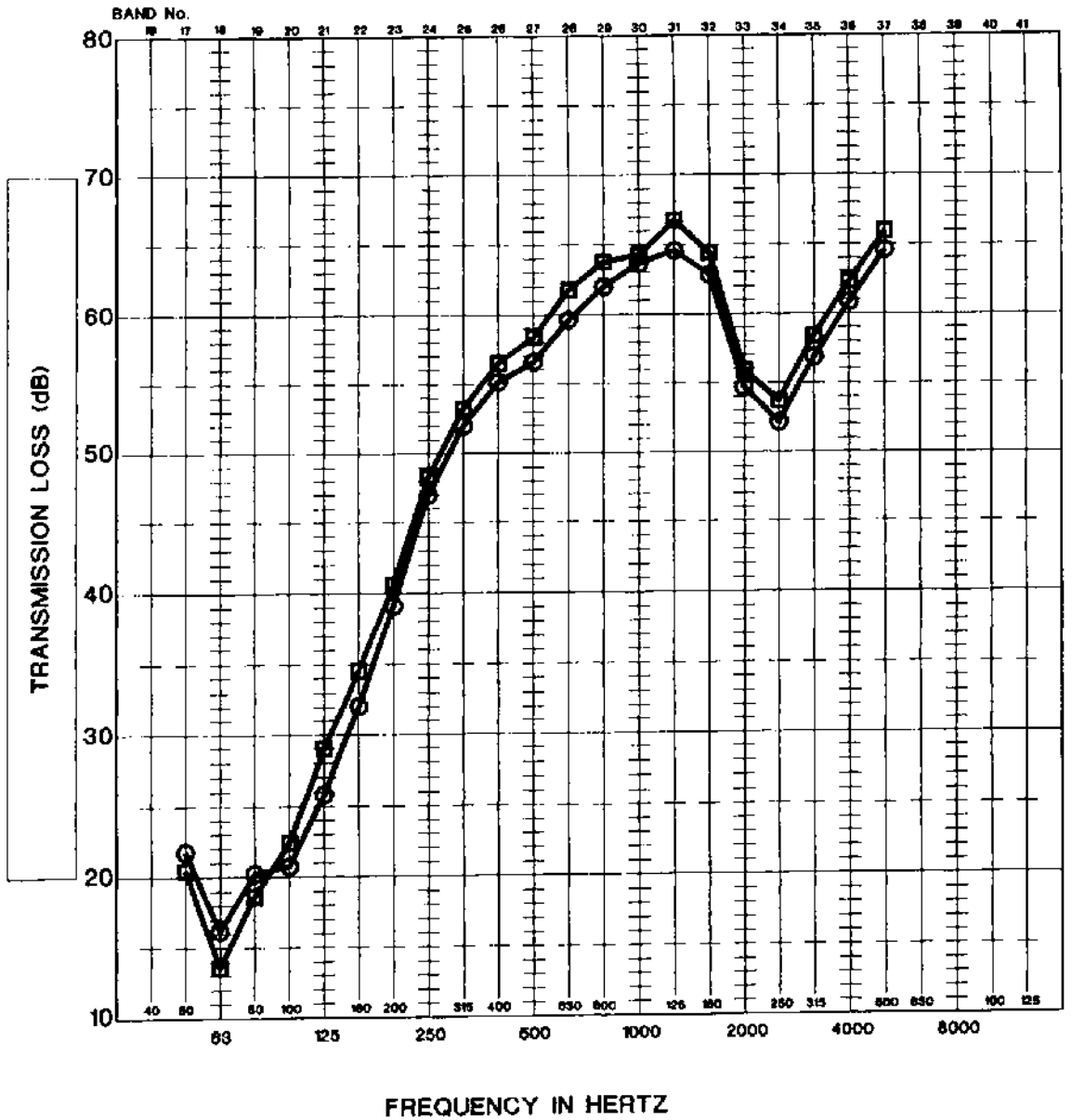
G16_WS90(406)_GFB90_RC13(406)_G16
(TL-93-117)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING THE SPACING OF RESILIENT CHANNELS

GRAPH NUMBER 91	**FILE NAME:** 177GRA091
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 53)
RESILIENT CHANNEL SPACING @ 610 mm

2G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-116)

(STC 50)
RESILIENT CHANNEL SPACING @ 406 mm

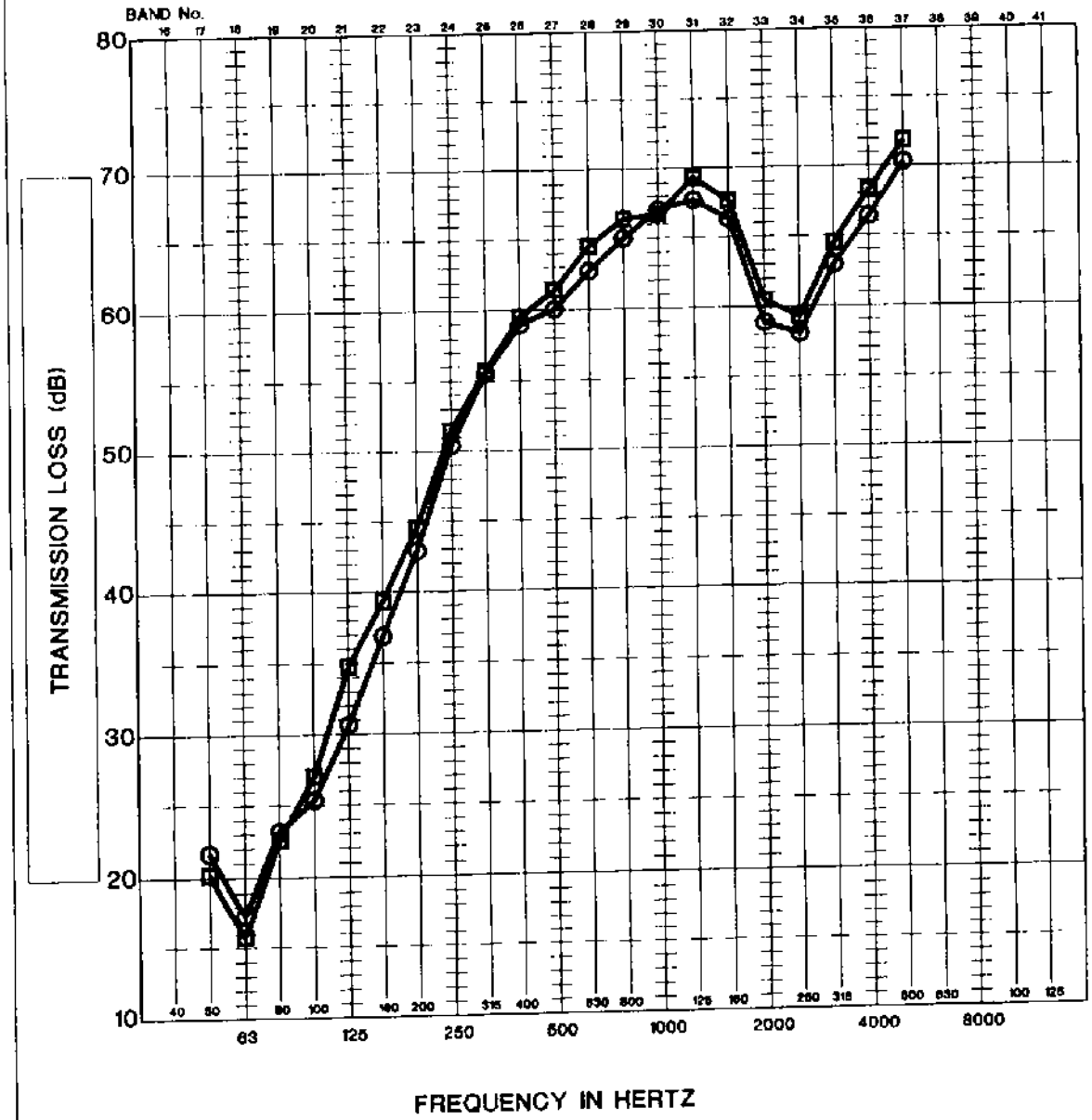
2G16_WS90(406)_GFB90_RC13(406)_G16
(TL-93-120)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING THE SPACING OF RESILIENT CHANNELS

GRAPH NUMBER 92	**FILE NAME** 177GRA092
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 59)
RESILIENT CHANNEL SPACING @ 610 mm

2G16_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-115)

(STC 55)
RESILIENT CHANNEL SPACING @ 406 mm

2G16_WS90(406)_GFB90_RC13(406)_2G16
(TL-93-119)

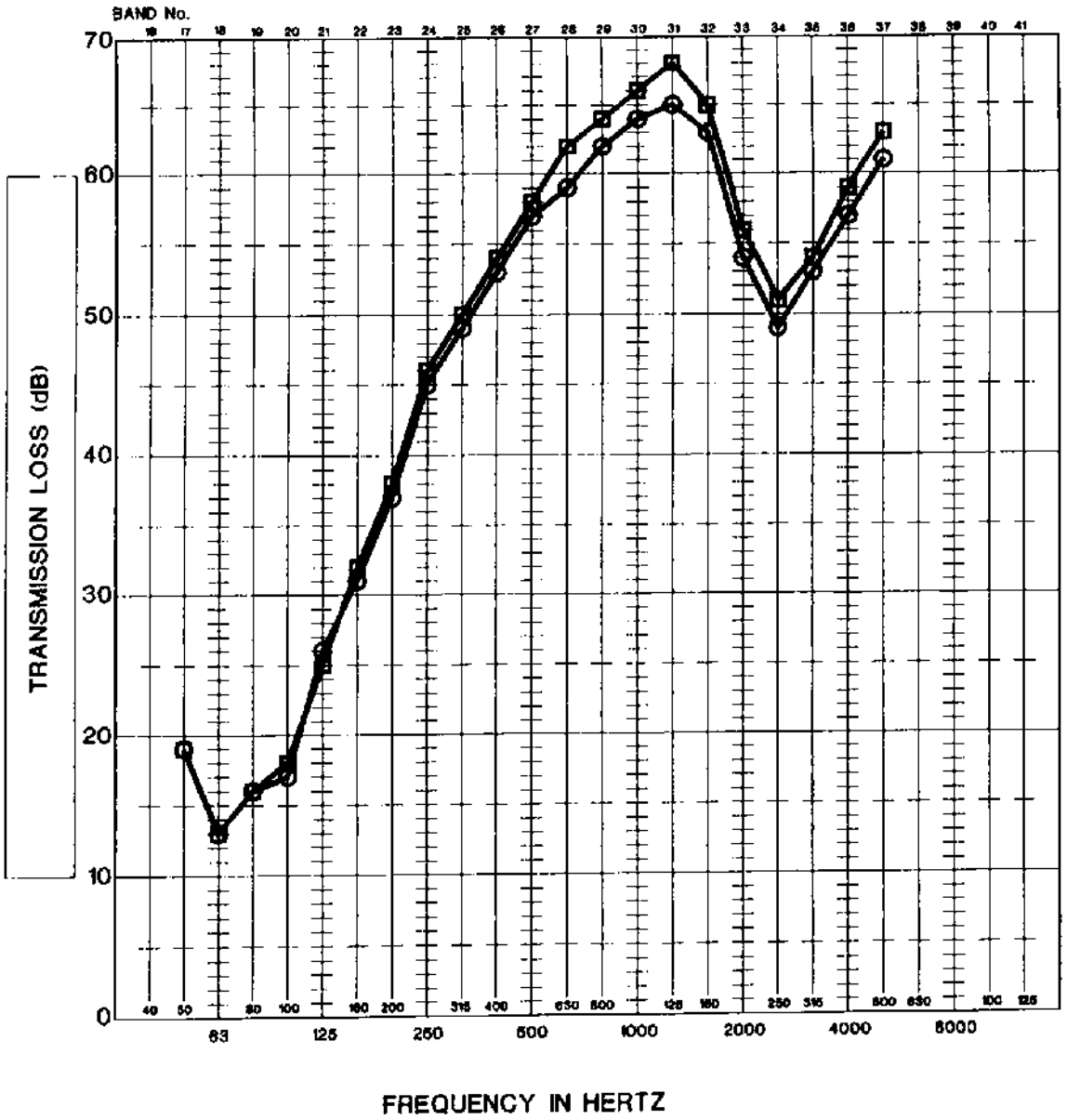
PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
THE EFFECTS OF VARYING THE SPACING OF RESILIENT CHANNELS

GRAPH NUMBER 93	**FILE NAME** 177GRA093
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



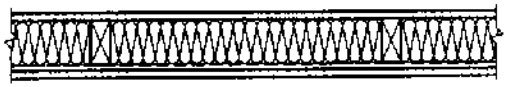
LEGEND

WOOD STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 49)
RESILIENT CHANNEL SPACING @ 610 mm

G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-082)

(STC 50)
RESILIENT CHANNEL SPACING @ 406 mm



G16_WS90(610)_GFB90_RC13(406)_G16
(TL-93-099)

PROJECT DESCRIPTION

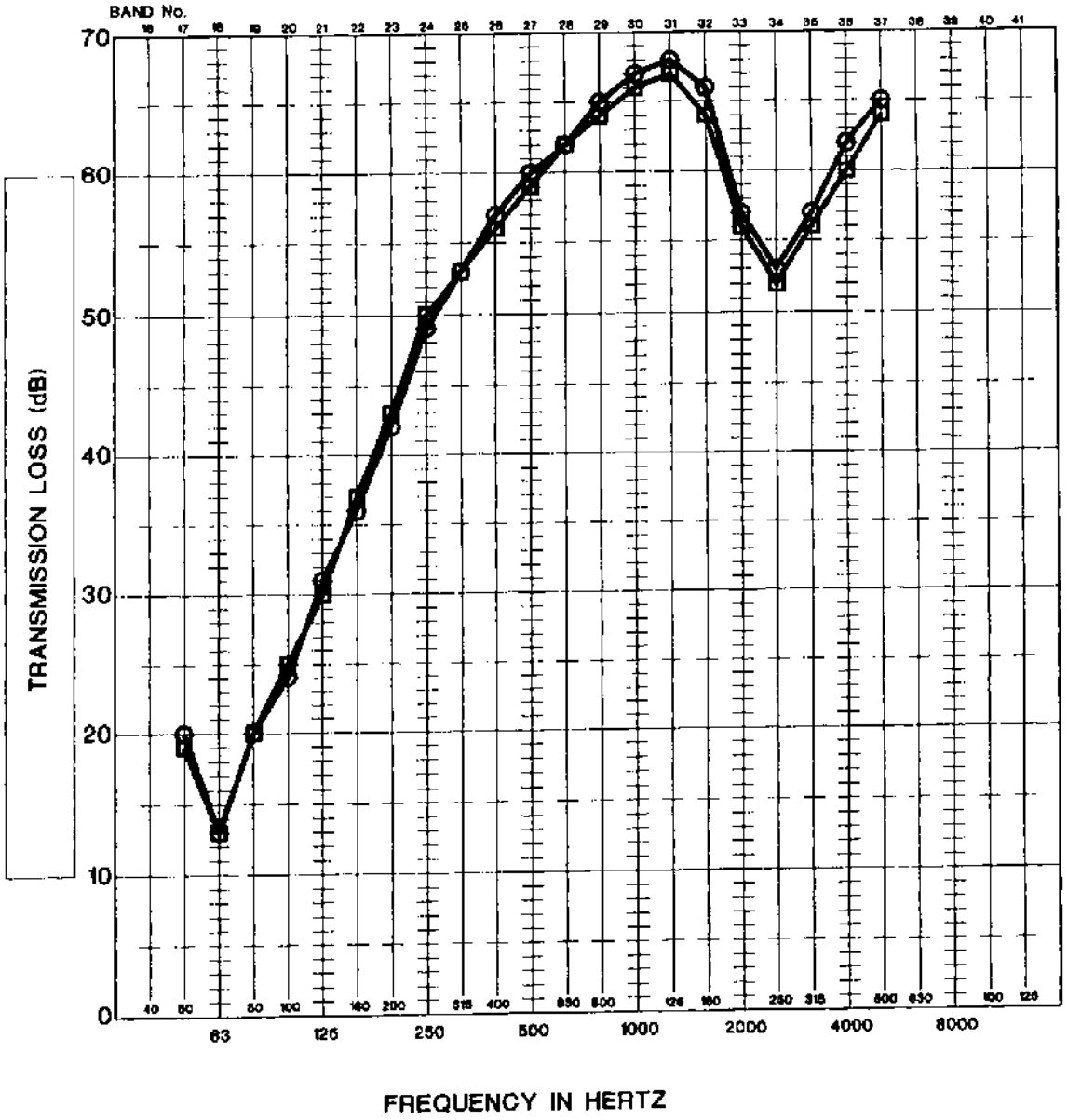
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF VARYING THE SPACING OF RESILIENT CHANNELS

GRAPH NUMBER 94	**FILE NAME** 177GRA094
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 610 mm
GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM BOARDS

(STC 55)
RESILIENT CHANNELS @ 406 mm

2G16_WS90(610)_GFB90_RC13(406)_G16
(TL-93-101)

(STC 54)
RESILIENT CHANNELS @ 610 mm

2G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-102)

PROJECT DESCRIPTION

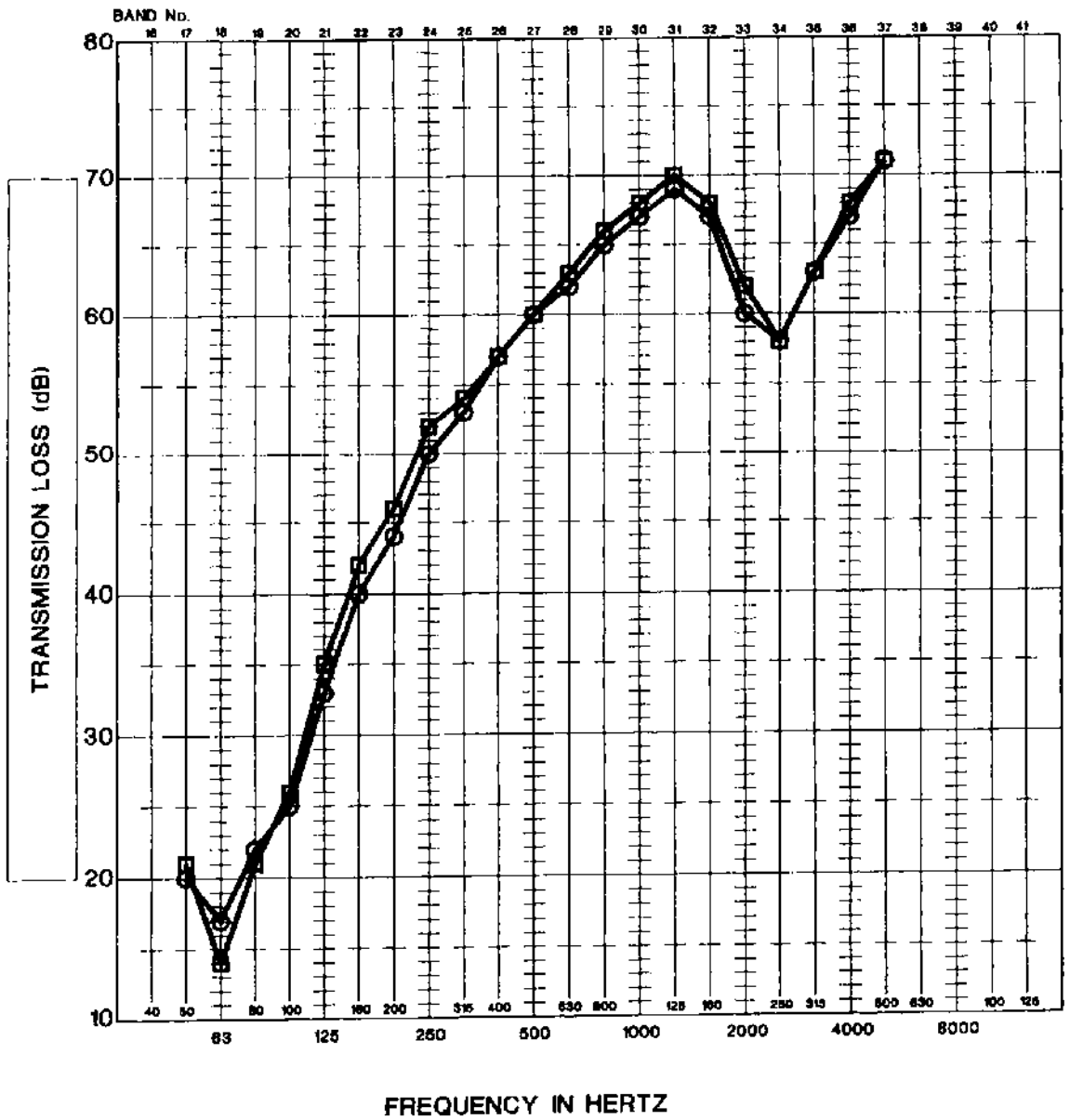
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF VARYING THE SPACING OF RESILIENT CHANNELS

GRAPH NUMBER 95	**FILE NAME** 177GRA095
PROJECT NUMBER 177.011	**DATE** 2001 12

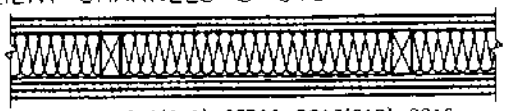
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 59)
RESILIENT CHANNELS @ 610 mm



2G16_WS90(610)_GFB90_RC13(610)_2G16
(TL-93-086)

(STC 57)
RESILIENT CHANNELS @ 406 mm

2G16_WS90(610)_GFB90_RC13(406)_2G16
(TL-93-100)

PROJECT DESCRIPTION

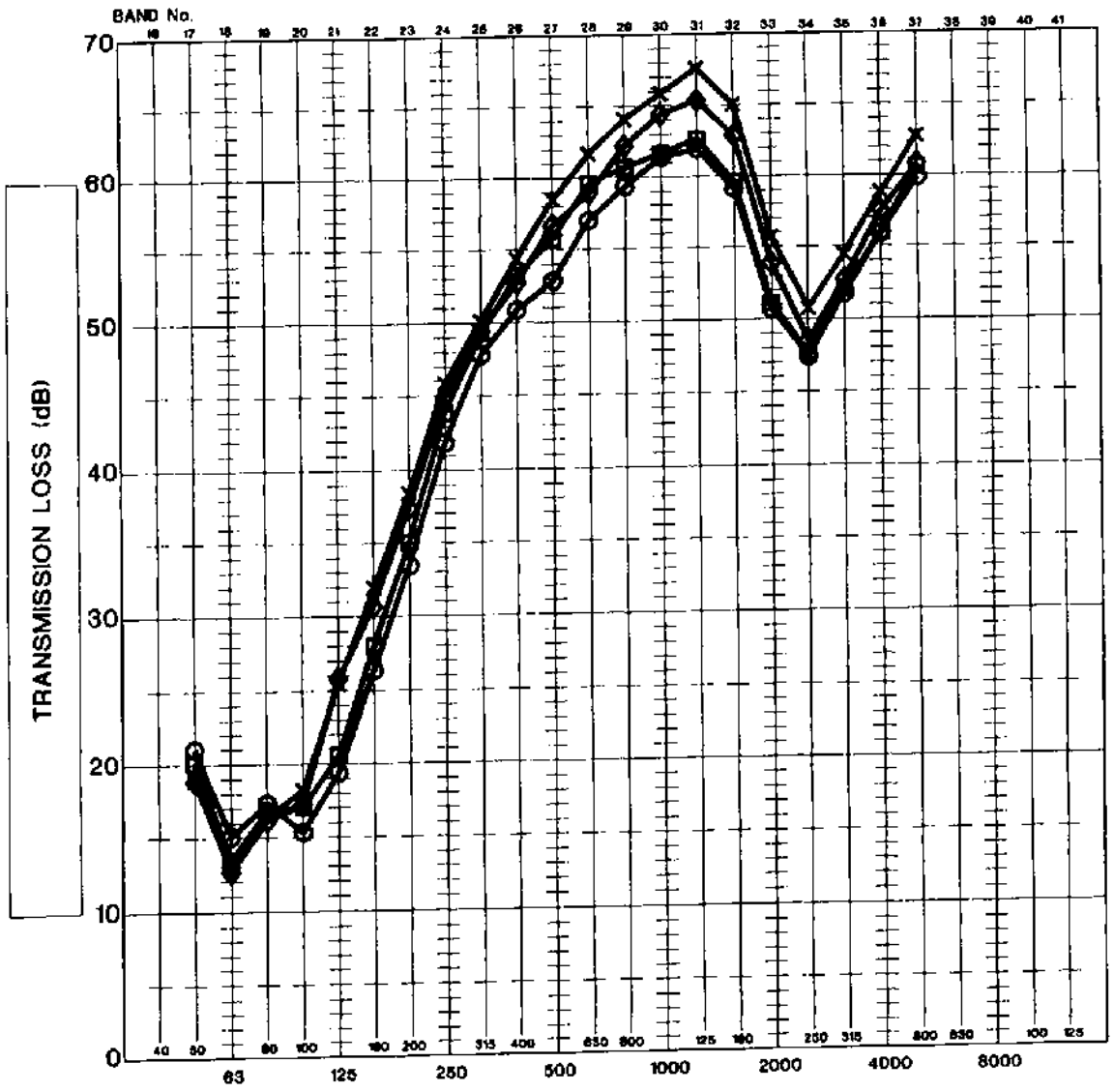
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF VARYING THE SPACING OF RESILIENT CHANNELS

GRAPH NUMBER 96	**FILE NAME** 177GRA096
PROJECT NUMBER 177.011	**DATE** 2001 12

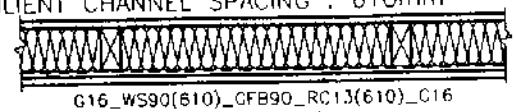
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

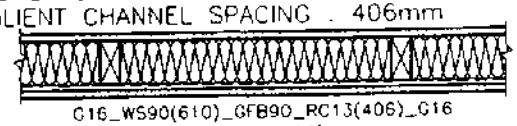
16 mm TYPE "X" GYPSUM BOARDS

(STC 49)
STUD SPACING 610mm
RESILIENT CHANNEL SPACING . 610mm



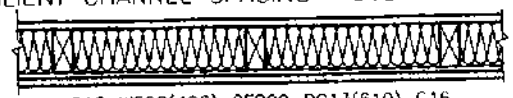
G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-082)

(STC 50)
STUD SPACING . 610mm
RESILIENT CHANNEL SPACING . 406mm



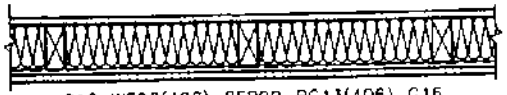
G16_WS90(610)_GFB90_RC13(406)_G16
(TL-93-098)

(STC 45)
STUD SPACING 406mm
RESILIENT CHANNEL SPACING 610mm



G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-109)

(STC 43)
STUD SPACING . 406mm
RESILIENT CHANNEL SPACING . 406mm



G16_WS90(406)_GFB90_RC13(406)_G16
(TL-93-117)

PROJECT DESCRIPTION

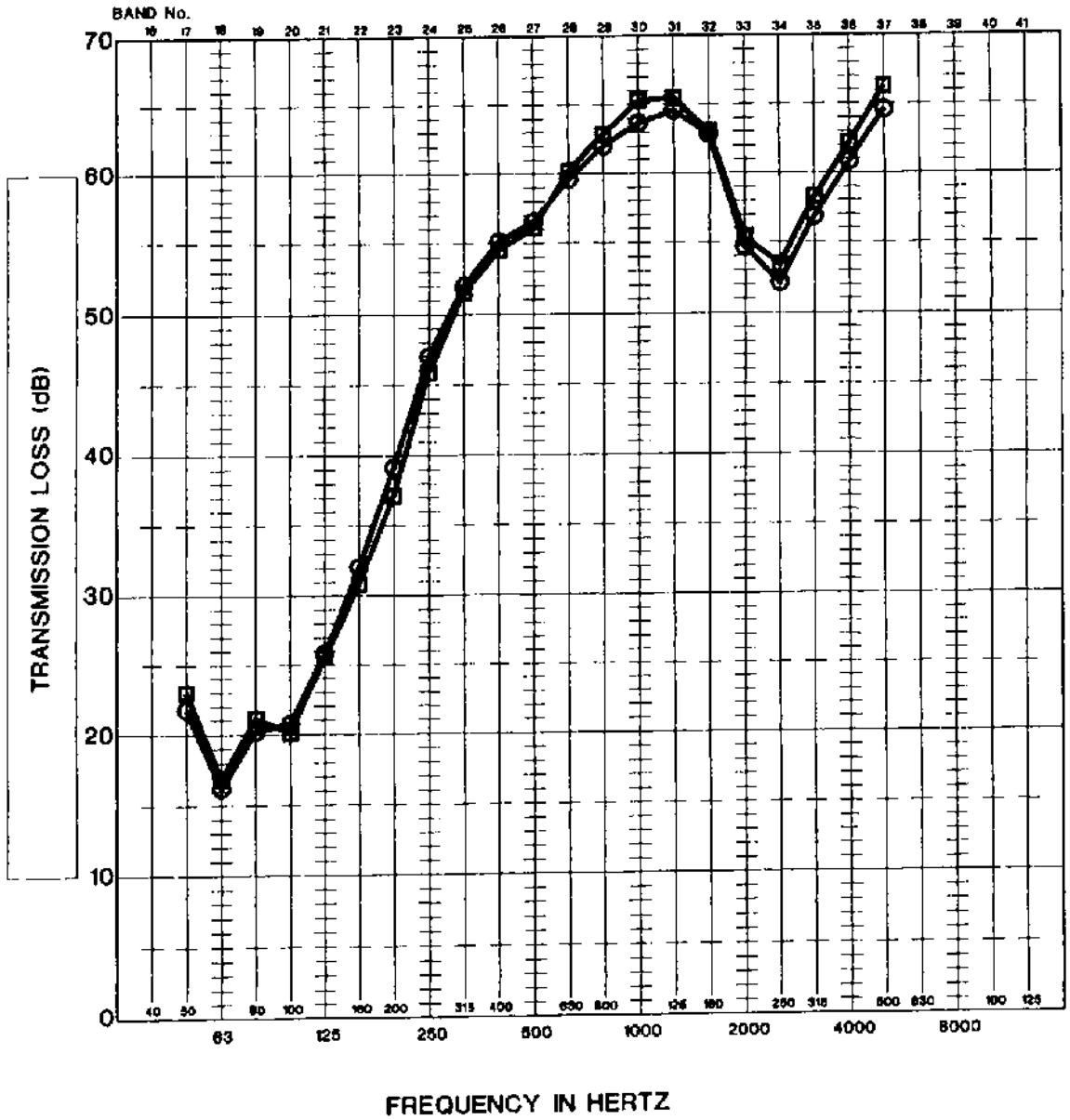
NOIS ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECT OF STUD AND RESILIENT CHANNEL SPACING

GRAPH NUMBER 97	**FILE NAME** 177GRA097
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUD @ 406 mm
16 mm TYPE "X" GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 406 mm

□——□ (STC 50)
RESILIENT CHANNELS INSTALLED ON SIDE OF PARTITION WITH TWO GYPSUM BOARDS

G16_WS90(406)_GF890_RC13(406)_2G16
(TL-93-118)

○——○ (STC 50)
RESILIENT CHANNELS INSTALLED ON SIDE OF PARTITION WITH ONE GYPSUM BOARD

2G16_WS90(406)_GF890_RC13(406)_G16
(TL-93-120)

PROJECT DESCRIPTION

NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

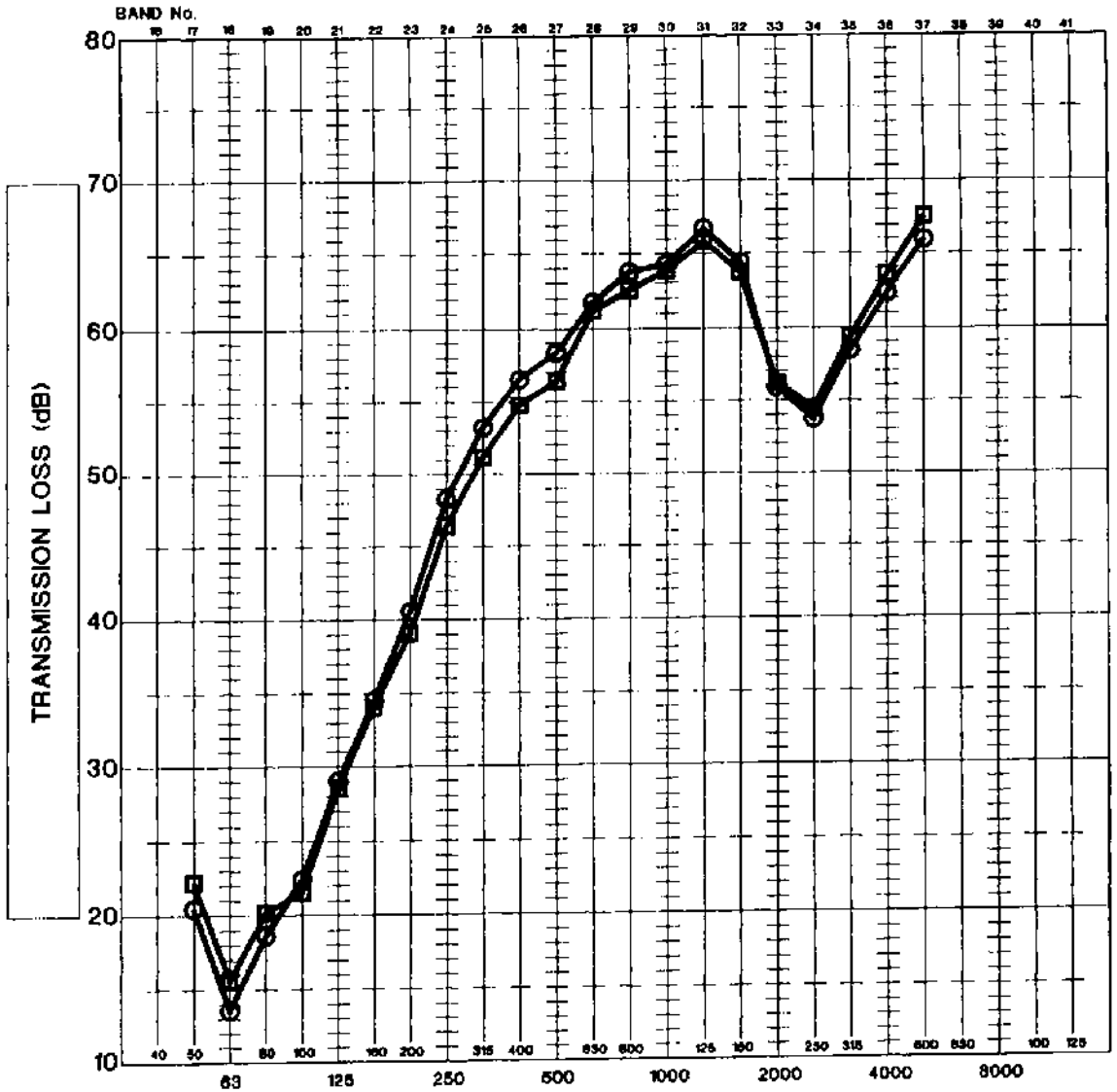
GRAPH TITLE

EFFECT OF POSITION OF RESILIENT CHANNEL

GRAPH NUMBER 98	**FILE NAME** 177GRA098
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

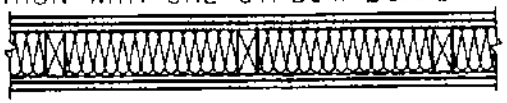
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE "X" GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

O——O (STC 53)
RESILIENT CHANNELS INSTALLED ON SIDE OF PARTITION WITH ONE GYPSUM BOARD



2G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-116)

□——□ (STC 53)
RESILIENT CHANNELS INSTALLED ON SIDE OF PARTITION WITH TWO GYPSUM BOARDS

G16_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-114)

PROJECT DESCRIPTION

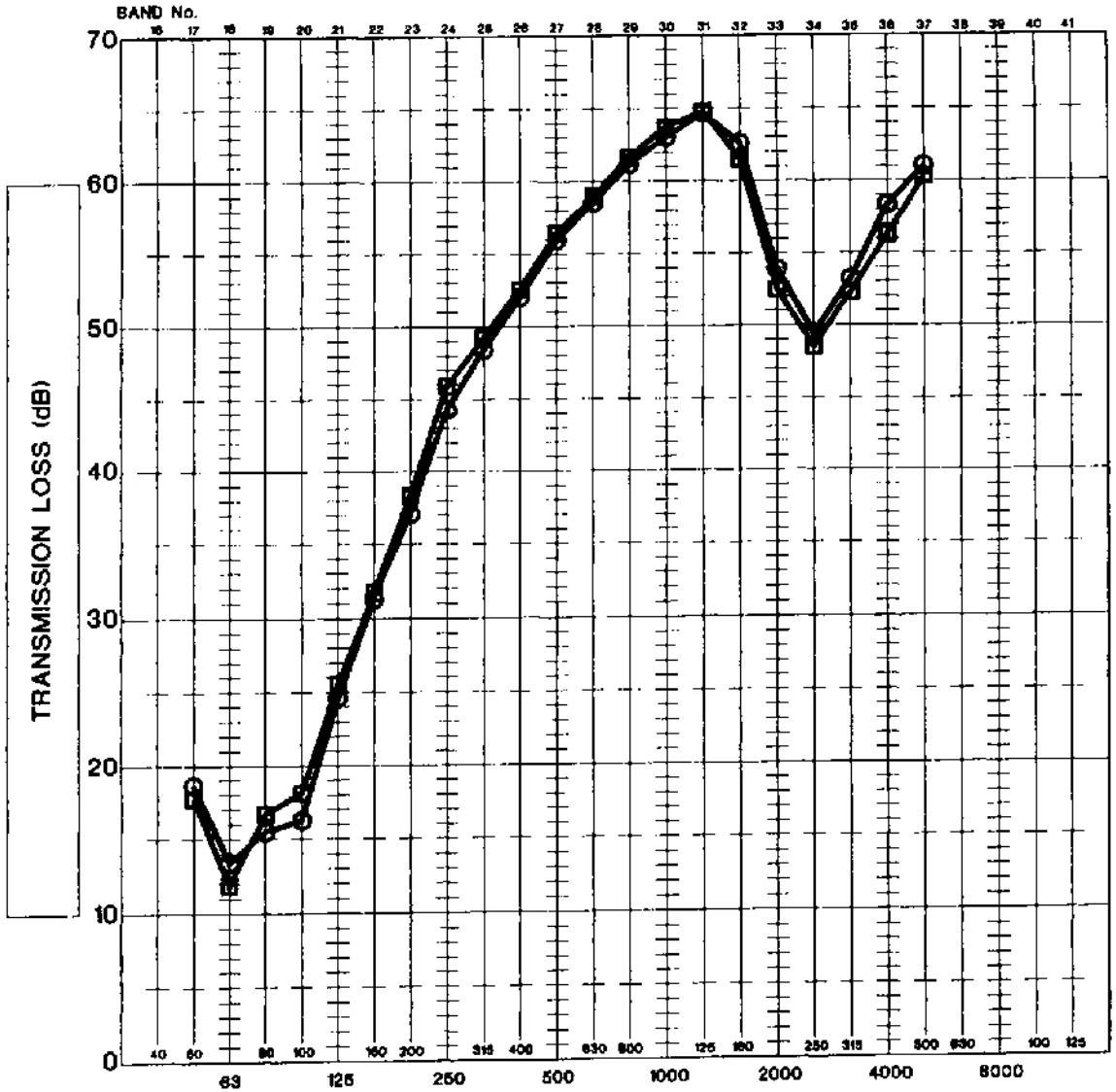
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECT OF RESILIENT CHANNEL POSITION

GRAPH NUMBER 99	**FILE NAME** 177GRA099
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

O——O (STC 49)
RESILIENT CHANNELS INSTALLED HORIZONTALLY

G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-088)

□——□ (STC 50)
RESILIENT CHANNELS INSTALLED VERTICALLY

G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-103)

PROJECT DESCRIPTION

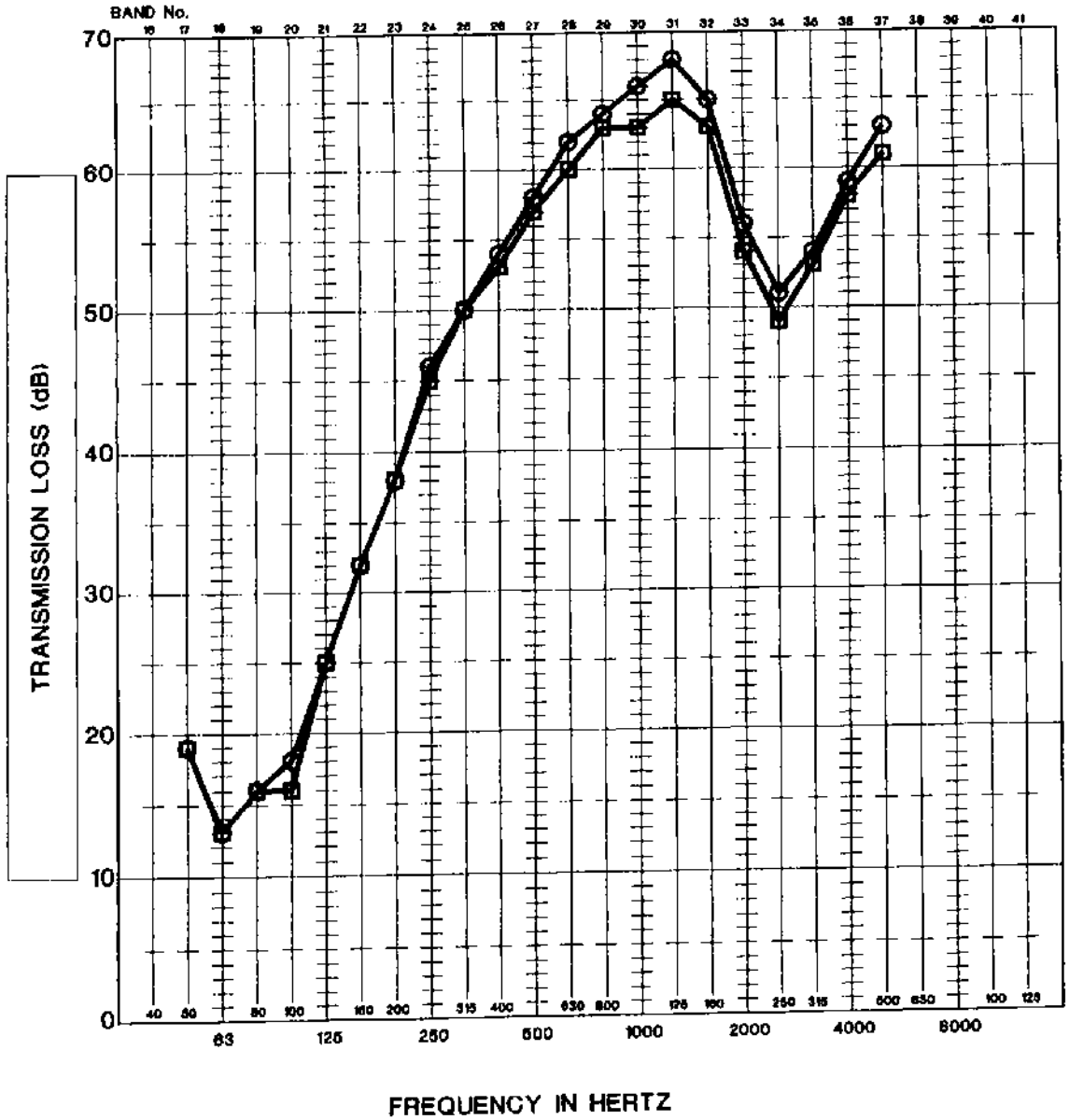
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF RESILIENT FURRING CHANNEL ORIENTATION

GRAPH NUMBER 100	**FILE NAME** 177GRA100
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



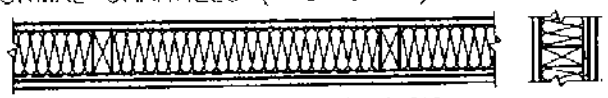
LEGEND

WOOD STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 610 mm

⊖ —— ⊖ (STC 49)
INVERTED CHANNELS (FACING DOWN)

G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-082)

⊟ —— ⊟ (STC 49)
NORMAL CHANNELS (FACING UP)



G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-083)

PROJECT DESCRIPTION

NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

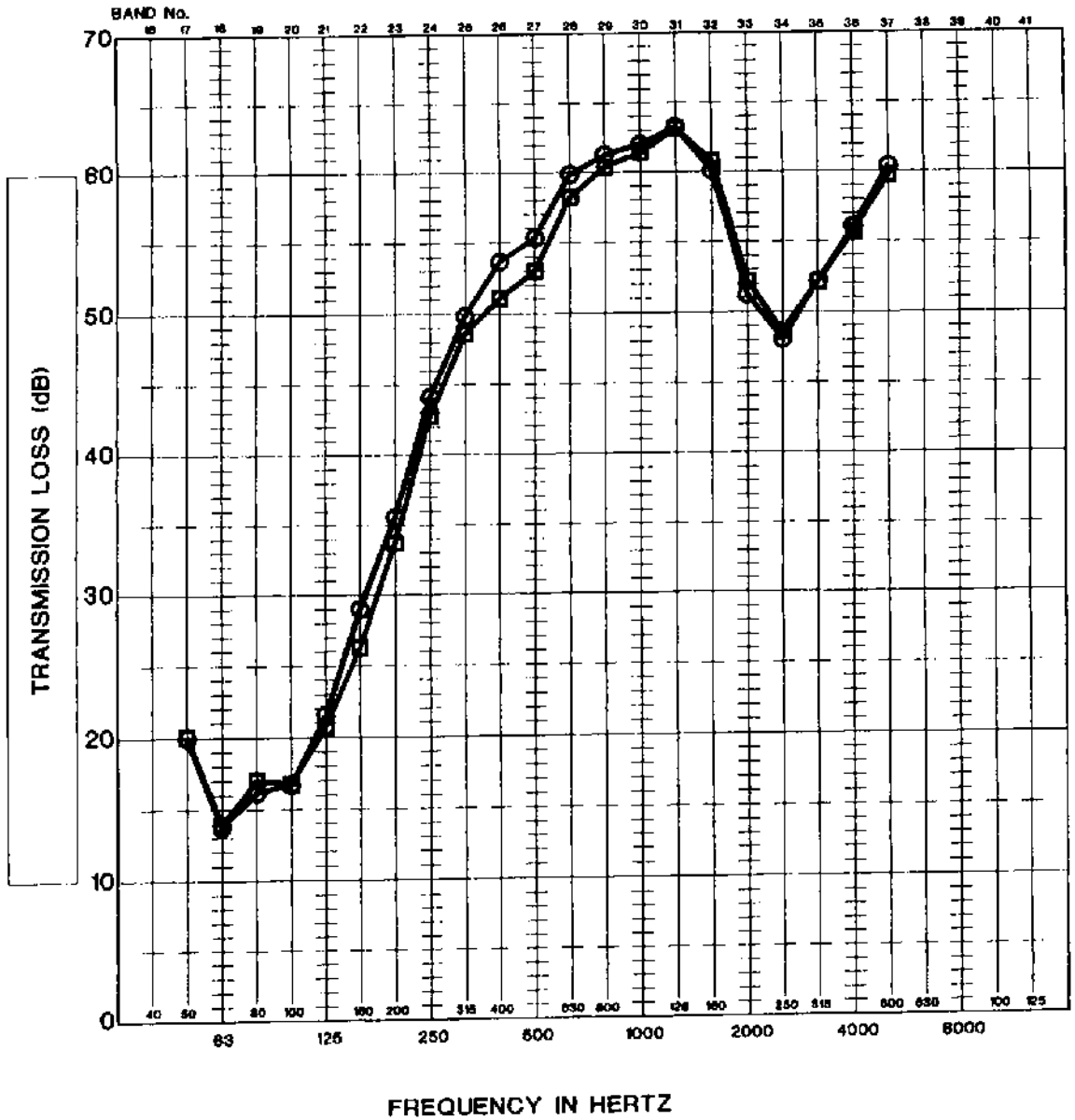
GRAPH TITLE

INSTALLING THE RESILIENT CHANNELS UPSIDE DOWN

GRAPH NUMBER 101	**FILE NAME** 177GRA101
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE "X" GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANELS @ 610 mm

(STC 46)
RESILIENT FURRINGS OF TYPE "G.P."

G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-111)

(STC 45)
RESILIENT FURRINGS OF TYPE "P.M."

G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-112)

PROJECT DESCRIPTION

NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

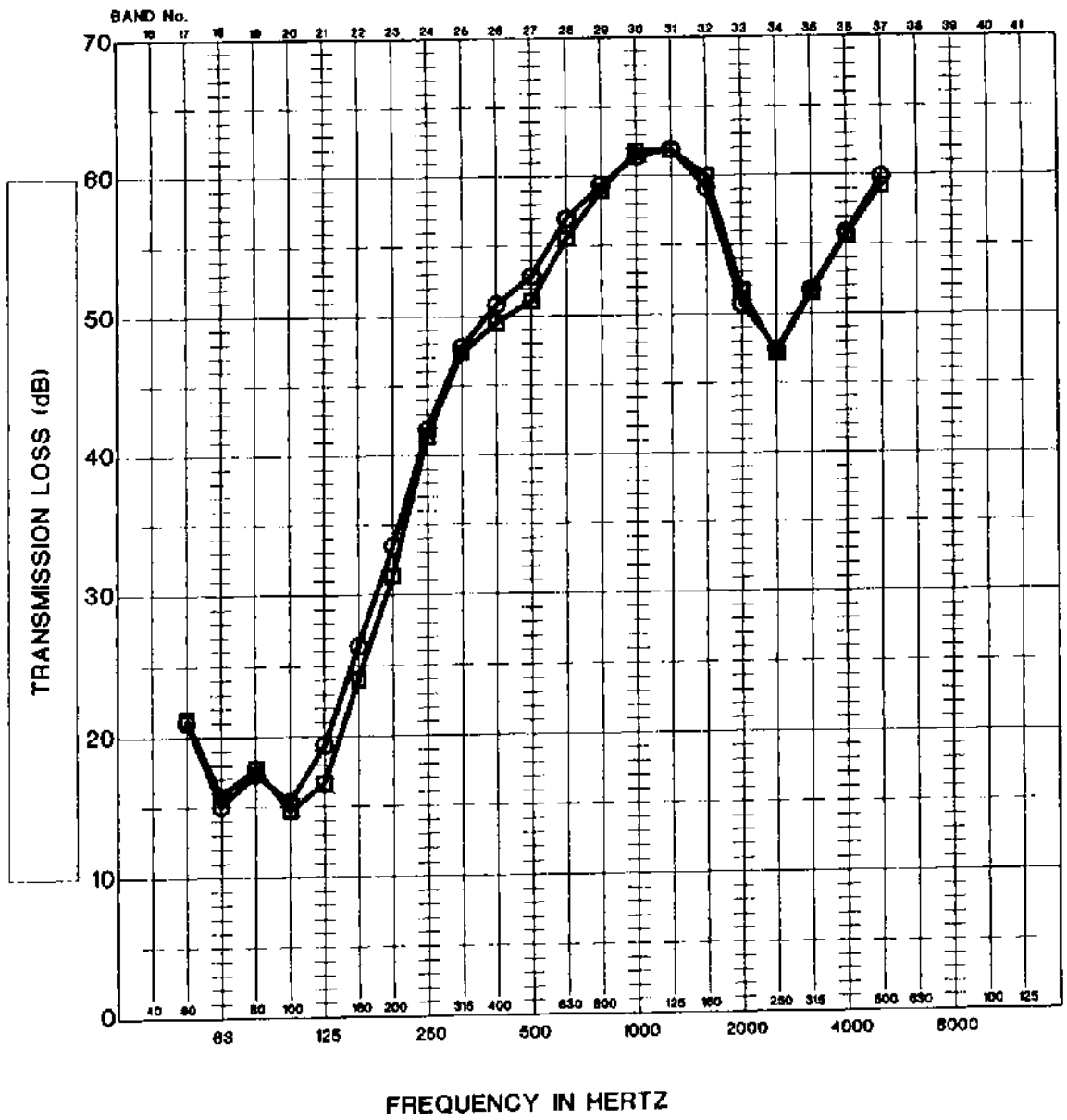
GRAPH TITLE

COMPARISION OF RESILIENT CHANNELS FROM TWO DIFFERENT MANUFACTURERS

GRAPH NUMBER 102	**FILE NAME:** 177GRA102
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE "X" GYPSUM BOARDS
GLASS FIBER INSULATION (G1)
RESILIENT CHANNELS @ 406 mm

O——O (STC 43)
RESILIENT CHANNELS OF TYPE "G.P."

G16_WS90(406)_GFB90_RC13(406)_G16
(TL-93-117)

□——□ (STC 41)
RESILIENT CHANNELS OF TYPE "P.M."

G16_WS90(406)_GFB90_RC13(406)_G16
(TL-93-121)

PROJECT DESCRIPTION

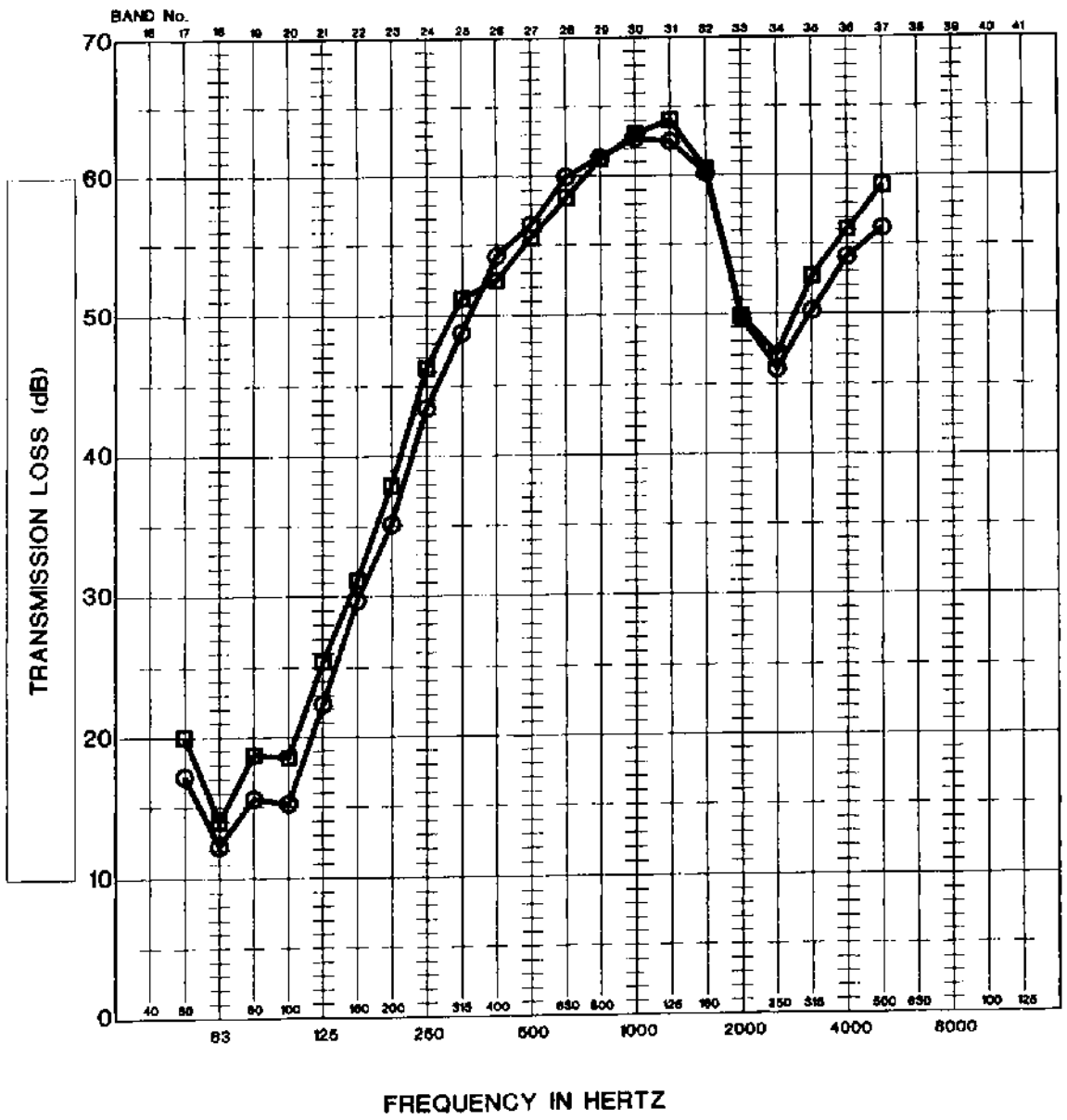
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISION OF RESILIENT CHANNELS FROM TWO DIFFERENT MANUFACTURERS

GRAPH NUMBER 103	**FILE NAME** 177GRA103
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
16 mm TYPE "X" GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 49)
RESILIENT CHANNELS ON ONE SIDE
16 Ga STEEL STUDS

G16_SS90(406)_GFB90_RC13(610)_G16
(TL-93-355)

(STC 46)
NO RESILIENT CHANNELS
25 Ga STEEL STUDS

G16_SS90(406)_GFB90_G16
(TL-94-028)

PROJECT DESCRIPTION

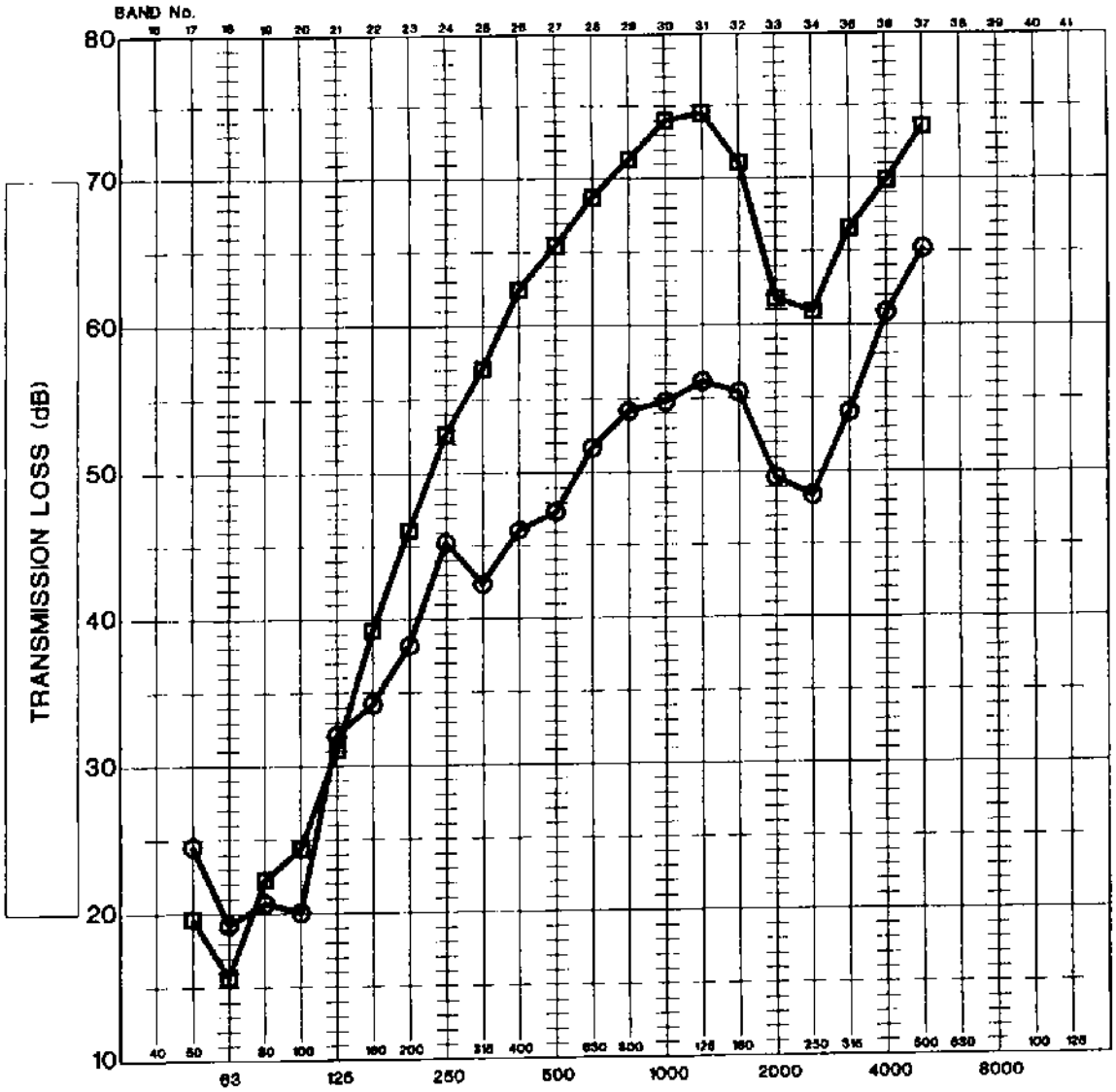
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN LIGHT WEIGHT STEEL STUDS AND HEAVY GAUGE STUDS WITH RESILIENT CHANNELS

GRAPH NUMBER 104	**FILE NAME** 177GRA104
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

□——□ (STC 55)
WOOD STUDS @ 406 mm
RESILIENT CHANNEL SPACING = 610 mm

G16_RC13(610)_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-160)

○——○ (STC 50)
WOOD STUDS @ 610 mm
FIBER BOARD THICKNESS = 19 mm

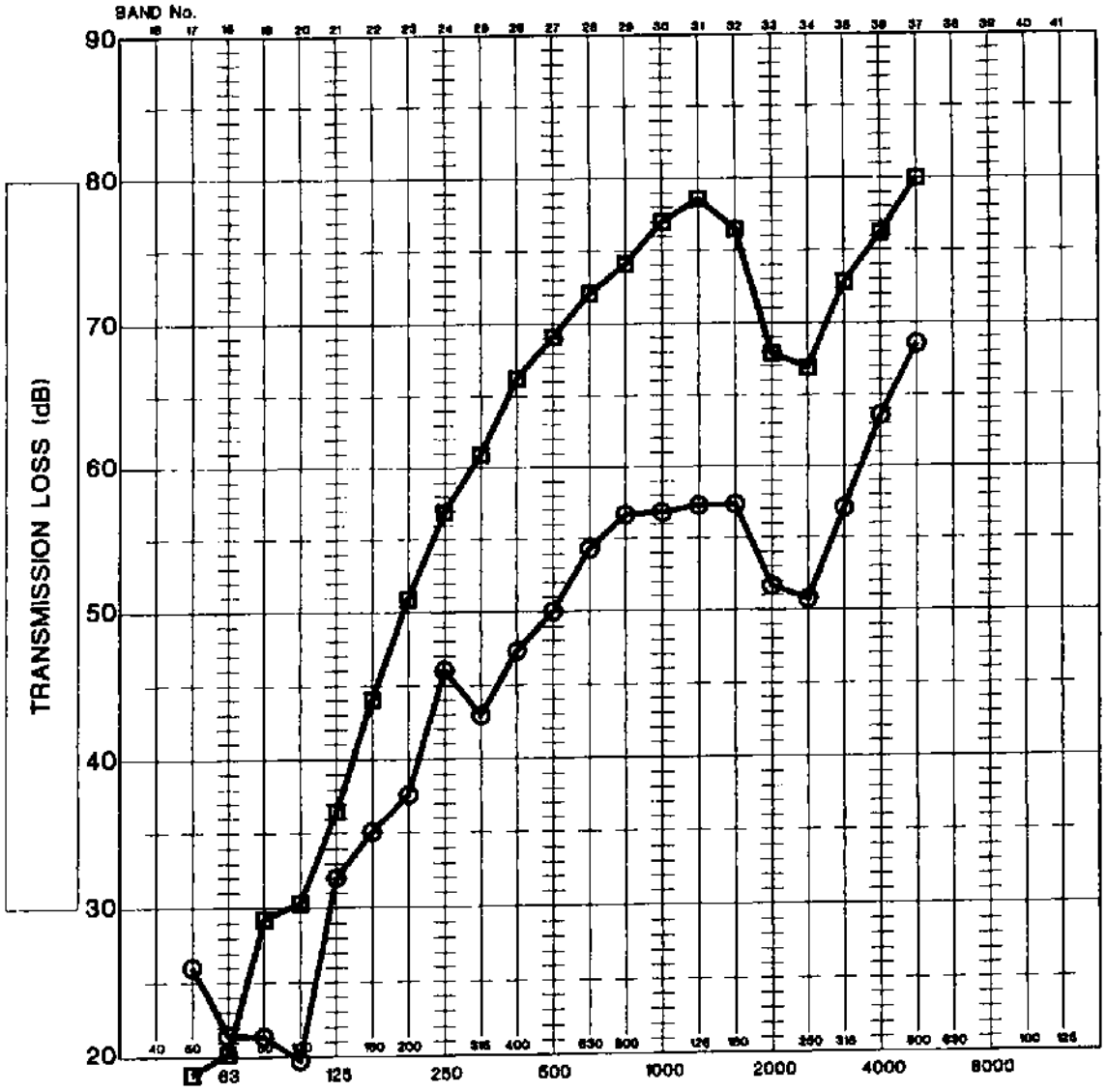
G16_WFB19_WS90(610)_GFB90_WFB19_2G16
(TL-93-192)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON BETWEEN FIBER BOARD AND RESILIENT FURRING CHANNELS

GRAPH NUMBER 105	**FILE NAME:** 177GRA105
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

GLASS FIBER INSULATION (G1)
16 mm TYPE 'X' GYPSUM BOARDS

(STC 60)
WOOD STUDS @ 406 mm
RESILIENT CHANNEL SPACING = 610 mm

2G16_RC13(610)_WS90(406)_GFB90_RC13(610)_2G16
(TL-93-161)

(STC 52)
WOOD STUDS @ 610 mm
FIBER BOARD THICKNESS = 19 mm

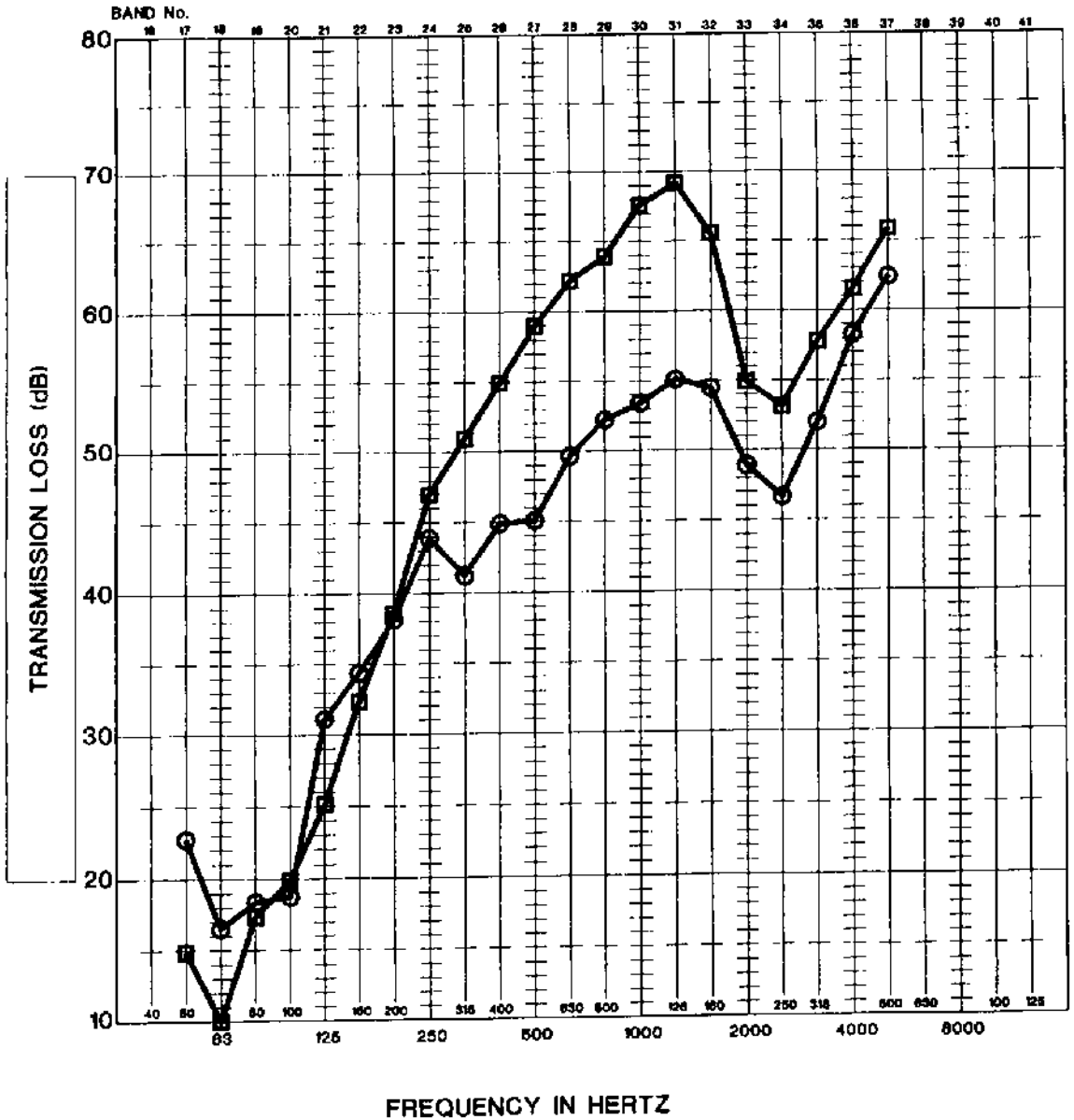
2G16_WFB19_WS90(610)_GFB90_WFB19_2G16
(TL-93-193)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON BETWEEN FIBER BOARD AND RESILIENT FURRING CHANNELS

GRAPH NUMBER 106	**FILE NAME:** 177GRA106
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

□——□ (STC 49)
RESILIENT CHANNEL SPACING @ 610 mm

G16_RC13(610)_WS90(610)_GFB90_RC13(610)_G16
(TL-93-104)

○——○ (STC 49)
FIBER BOARD THICKNESS 19mm

G16_WFB19_WS90(610)_GFB90_WFB19_G16
(TL-93-190)

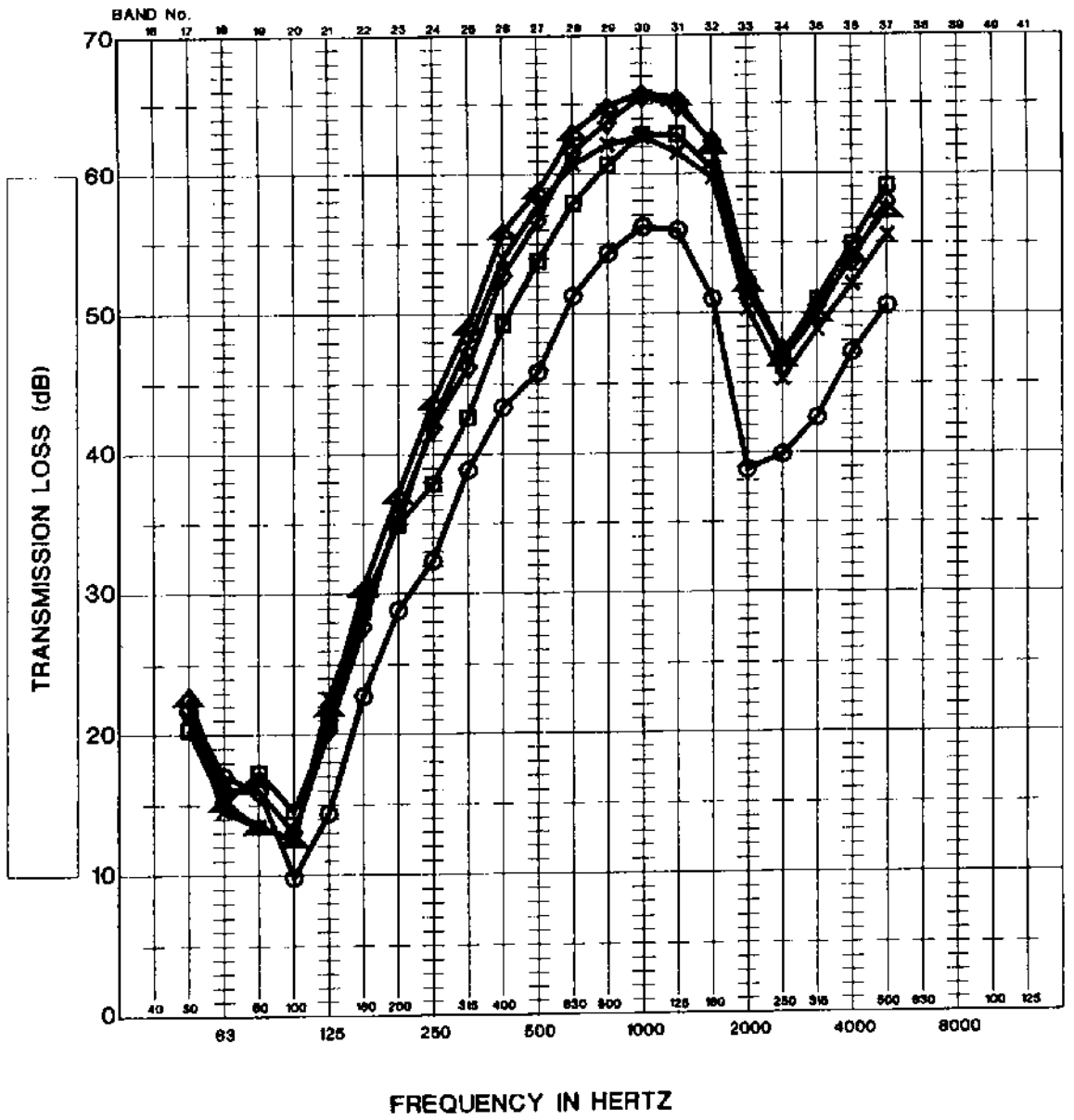
PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON BETWEEN FIBER BOARD AND RESILIENT FURRING CHANNELS

GRAPH NUMBER 107	**FILE NAME:** 177GRA107
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

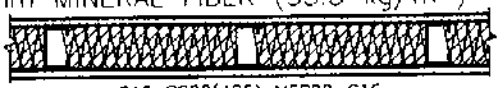
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

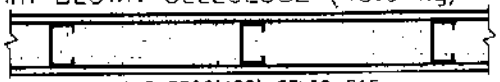
25 Ga STEEL STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS

(STC 46)
90 mm MINERAL FIBER (33.3 kg/m³)



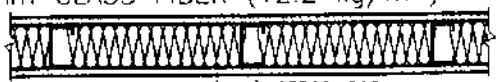
G16_SS90(406)_MFB90_G16
(TL-92-445)

(STC 44)
90 mm BLOWN CELLULOSE (45.6 kg/m³)



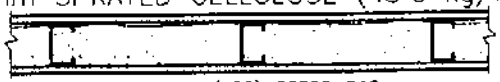
G16_SS90(406)_CFL90_G16
(TL-92-438)

(STC 47)
90 mm GLASS FIBER (12.2 kg/m³)



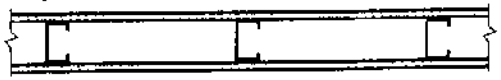
G16_SS90(406)_GFB90_G16
(TL-92-419)

(STC 45)
90 mm SPRAYED CELLULOSE (45.6 kg/m³)



G16_SS90(406)_CFS90_G16
(TL-93-049)

(STC 38)
EMPTY CAVITY



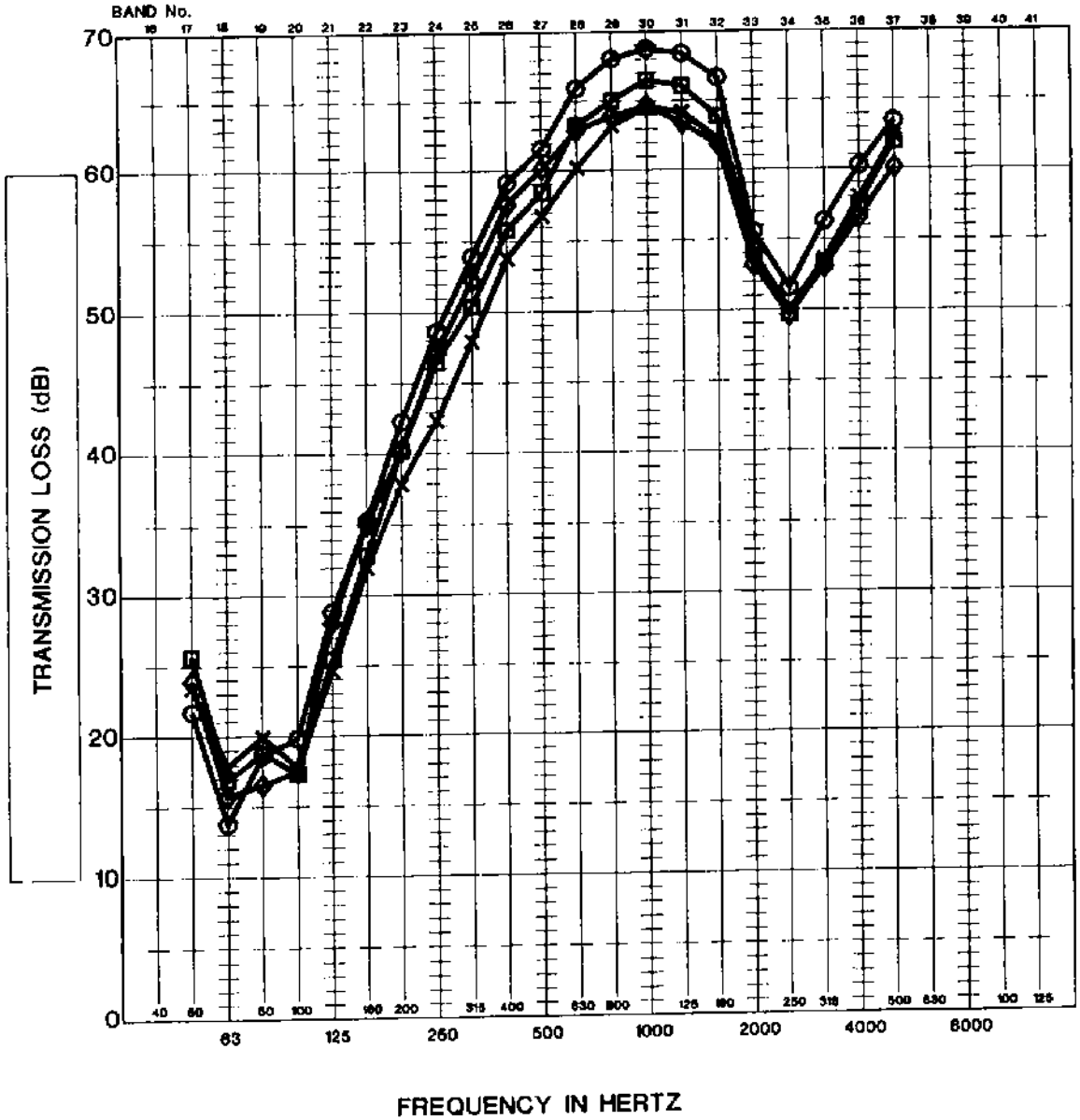
G16_SS90(406)_G16
(TL-92-418)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 108	**FILE NAME** 177GRA108
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



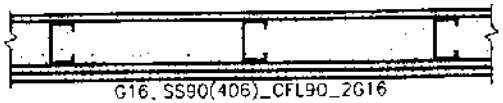
LEGEND

25 Ga STEEL STUDS @ 406 mm
16mm TYPE 'X' GYPSUM BOARDS

(STC 53)
90 mm MINERAL FIBER (35.6 kg/m³)

G16_SS90(406)_MFB90_2G16
(TL-93-329)

(STC 49)
90 mm BLOWN CELLULOSE (45.6 kg/m³)

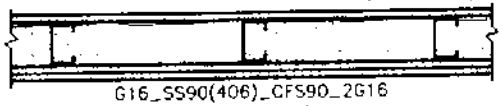


G16_SS90(406)_CFL90_2G16
(TL-93-437)

(STC 52)
90 mm GLASS FIBER (12.2 kg/m³)

G16_SS90(406)_GFB90_2G16
(TL-92-420)

(STC 49)
90 mm SPRAYED CELLULOSE (45.6 kg/m³)



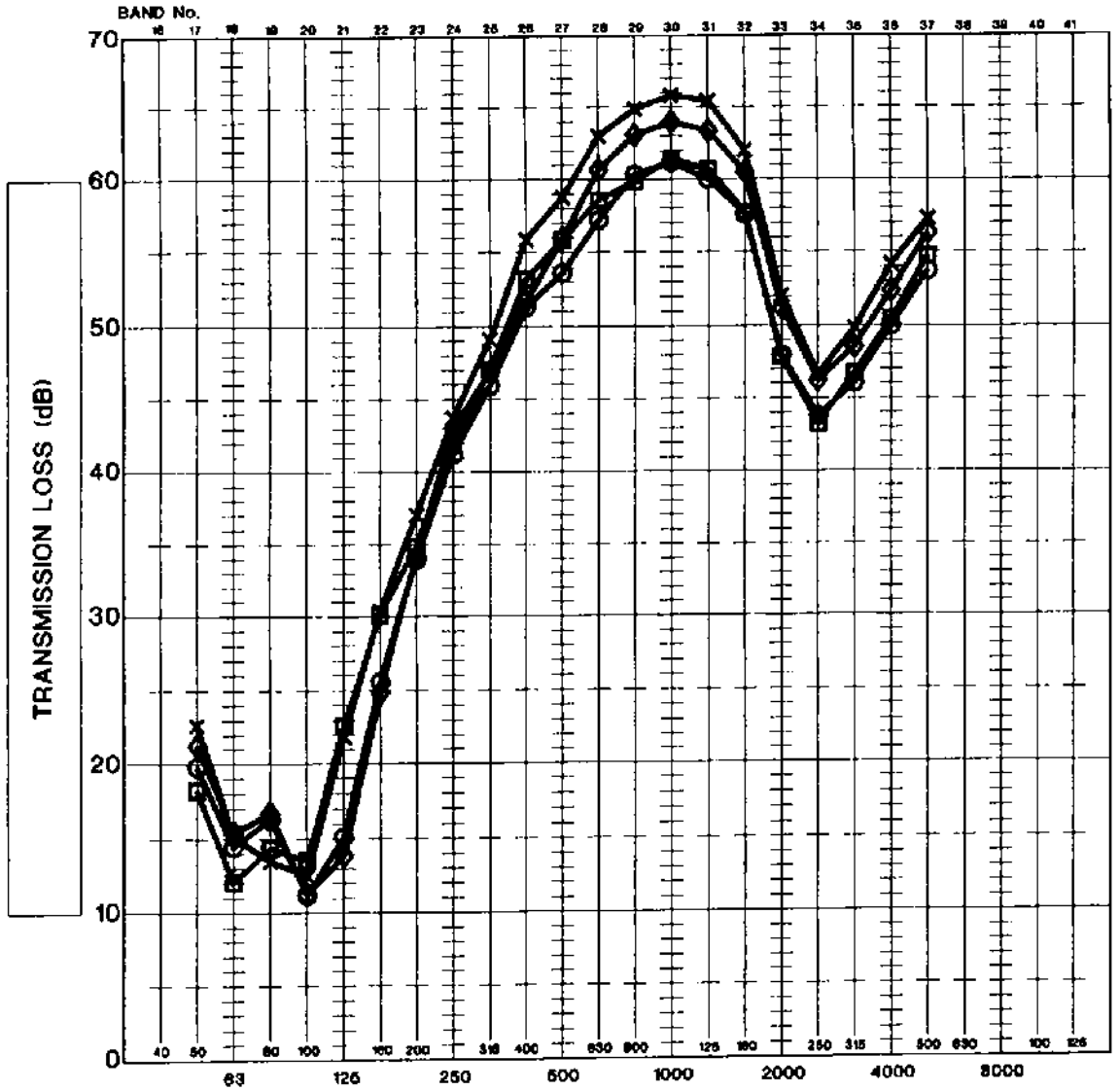
G16_SS90(406)_CFS90_2G16
(TL-93-050)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 109	**FILE NAME:** 177GRA109
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



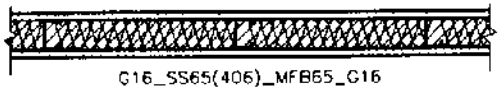
LEGEND

STEEL STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS

(STC 46)
90 mm MINERAL FIBER (33.3 kg/m³)

G16_SS90(406)_MFB90_G16
(TL-92-445)

(STC 38)
65 mm MINERAL FIBER (35.4 kg/m³)



G16_SS65(406)_MFB65_G16
(TL-93-061)

(STC 47)
90 mm GLASS FIBER (11.1 kg/m³)

G16_SS90(406)_GFB90_G16
(TL-93-074)

(STC 39)
65 mm GLASS FIBER (12.3 kg/m³)

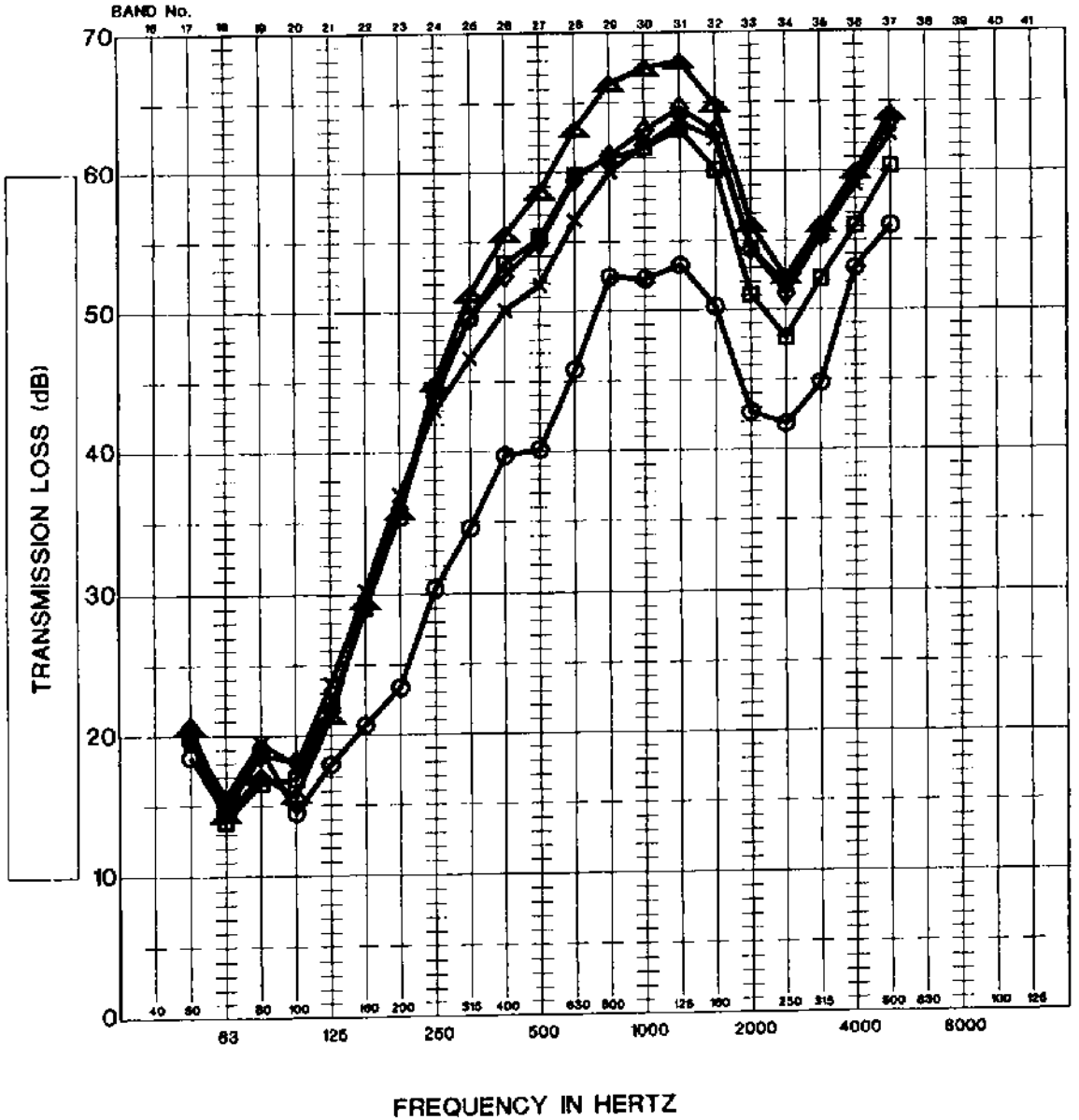
G16_SS65(406)_GFB65_G16
(TL-93-058)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 110	**FILE NAME** 177GRA110
PROJECT NUMBER 177 011	**DATE** 2001 12

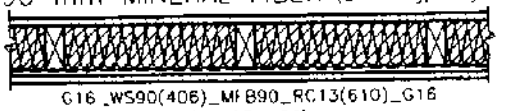
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

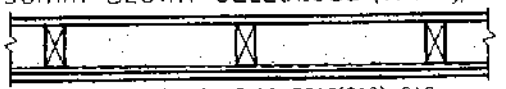
WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS

◇——◇ 90 mm MINERAL FIBER (25.6 kg/m³)
(STC 46)



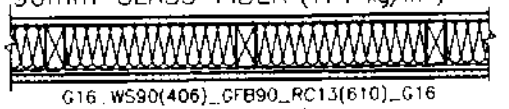
G16_WS90(406)_MFB90_RC13(610)_G16
(TL-93-156)

△——△ 90mm BLOWN CELLULOSE (60.0 kg/m³)
(STC 45)



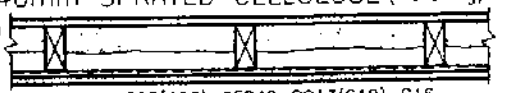
G16_WS90(406)_CFL90_RC13(610)_G16
(TL-93-105)

□——□ 90mm GLASS FIBER (11.1 kg/m³)
(STC 46)



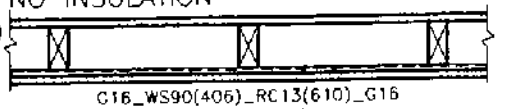
G16_WS90(406)_GFB90_RC13(610)_G16
(TL-93-110)

×——× 40mm SPRAYED CELLULOSE (70.0 kg/m³)
(STC 48)



G16_WS90(406)_CFS40_RC13(610)_G16
(TL-93-144)

○——○ NO INSULATION
(STC 40)



G16_WS90(406)_RC13(610)_G16
(TL-93-122)

PROJECT DESCRIPTION

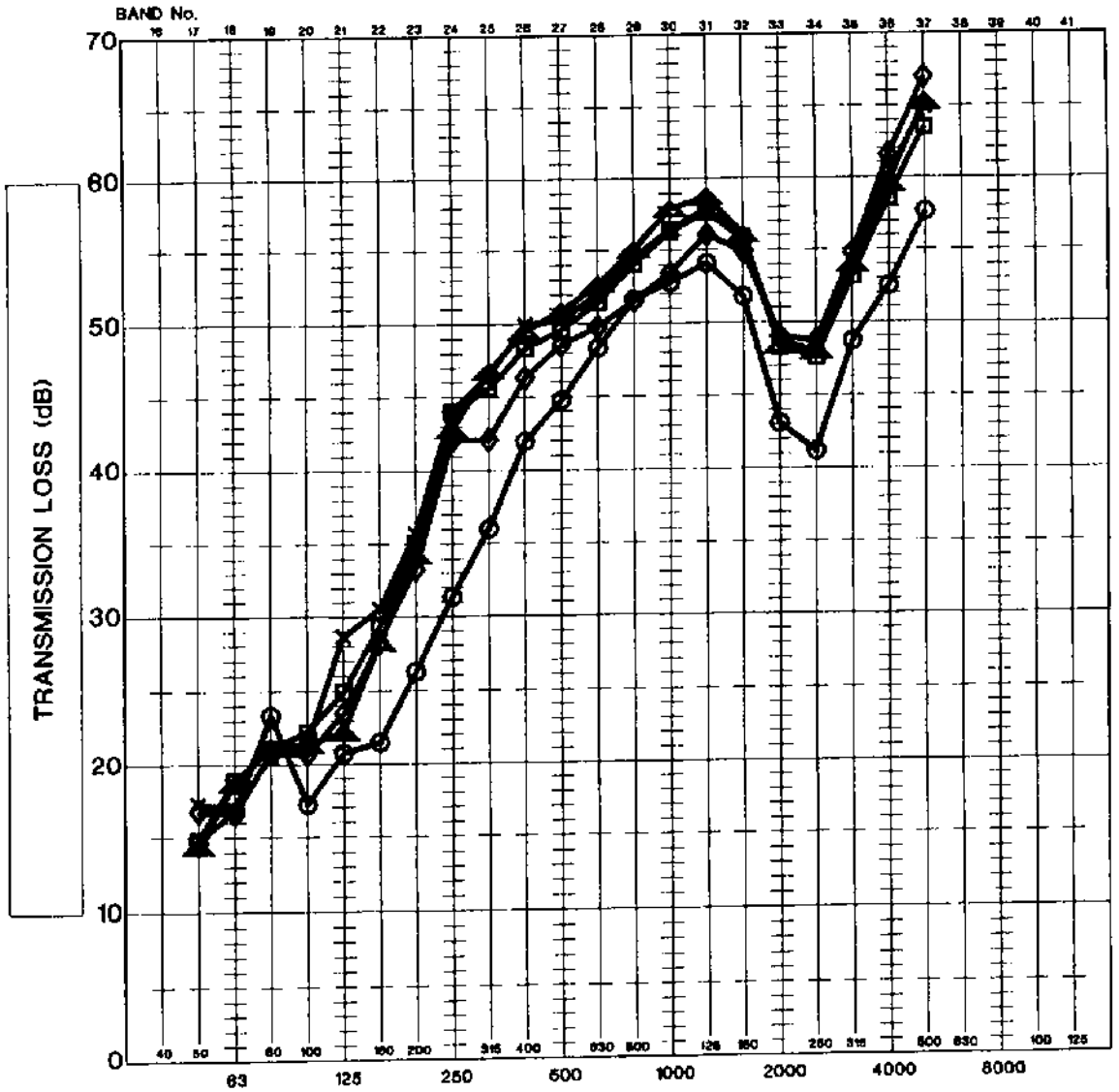
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 111	**FILE NAME:** 177GRA111
PROJECT NUMBER 177 011	**DATE** 2001 12

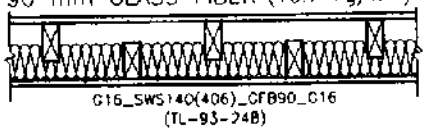
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



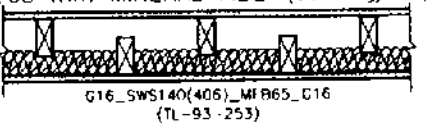
LEGEND

STAGGERED WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS

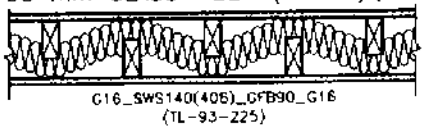
90 mm GLASS FIBER (16.7 kg/m³)
(STC 49)



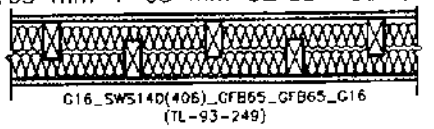
65 mm MINERAL FIBER (33.8 kg/m³)
(STC 46)



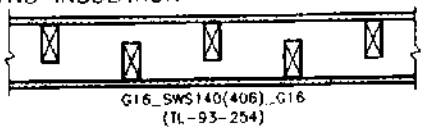
90 mm GLASS FIBER (WOVEN) (12.2 kg/m³)
(STC 47)



65 mm + 65 mm GLASS FIBER (24.6 kg/m³)
(STC 50)



NO INSULATION
(STC 41)



PROJECT DESCRIPTION

NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

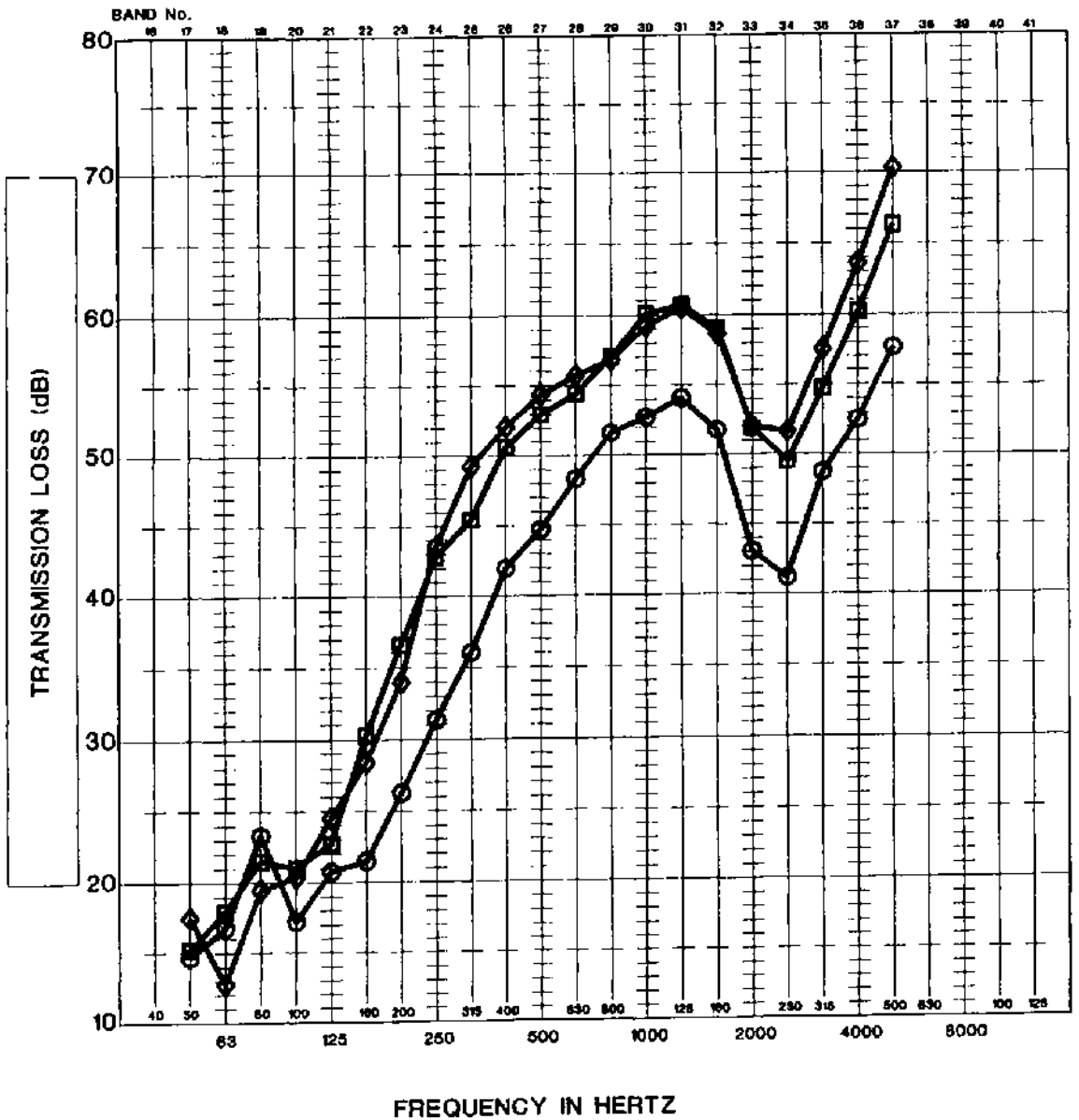
GRAPH TITLE

COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 112	**FILE NAME:** 177GRA112
PROJECT NUMBER 177 011	**DATE** 2001 12

mjm

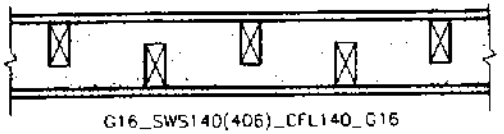
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

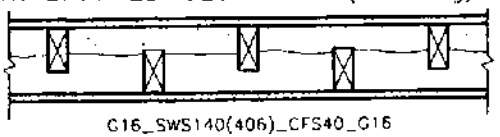
STAGGERED WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS

(STC 48)
140 mm BLOWN-IN CELLULOSE (50.0 kg/m³)



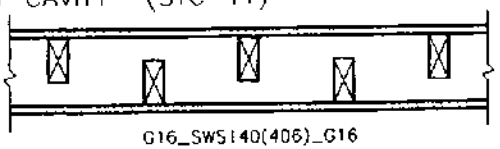
G16_SWS140(406)_CFL140_G16
(TL-93-231)

(STC 47)
40 mm SPRAYED CELLULOSE (70.0 kg/m³)



G16_SWS140(406)_CFS40_G16
(TL-93-242)

(STC 41)
EMPTY CAVITY (STC 41)



G16_SWS140(406)_G16
(TL-93-254)

PROJECT DESCRIPTION

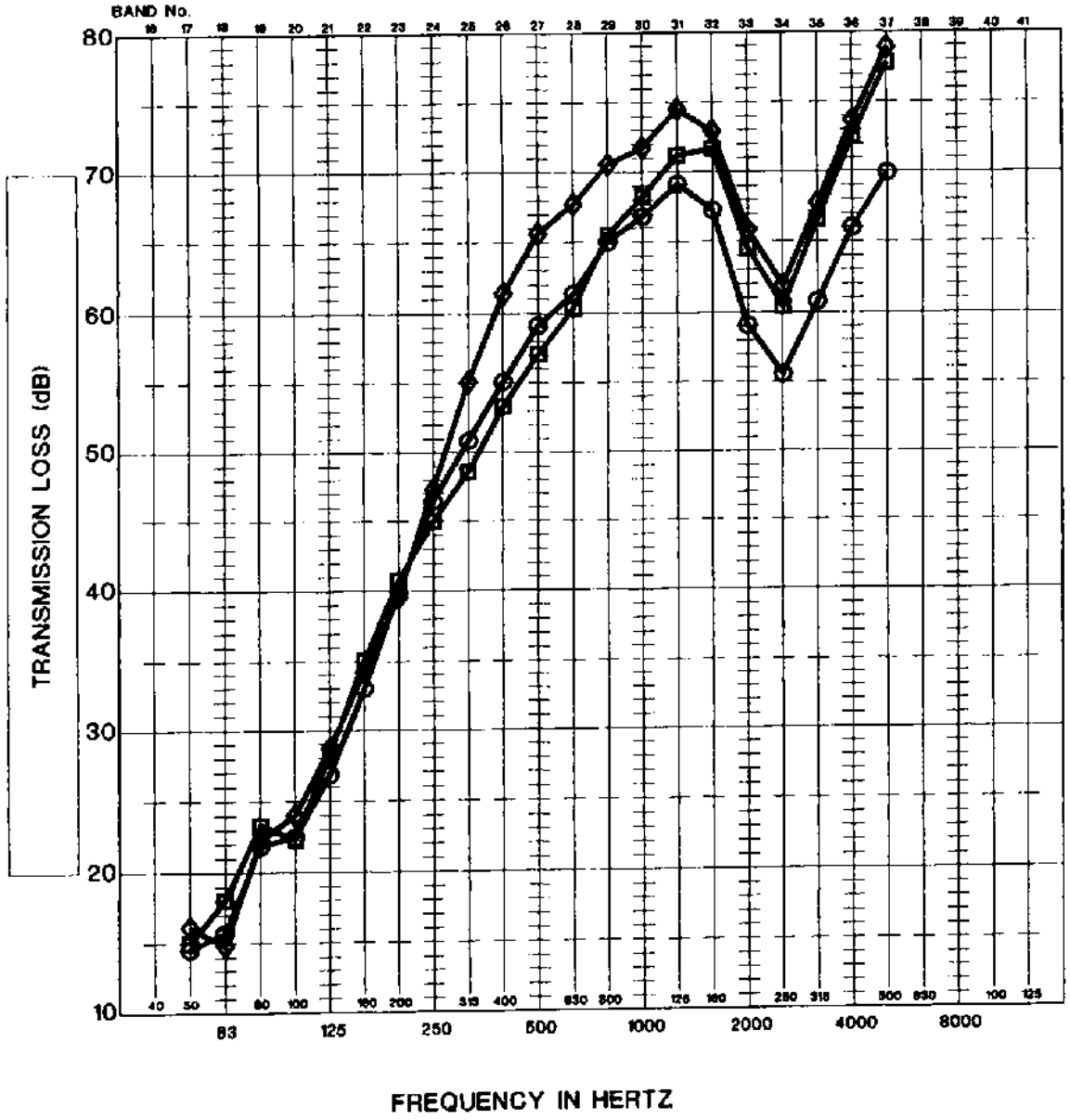
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 113	**FILE NAME** 177GRA113
PROJECT NUMBER 177.011	**DATE** 2001 12

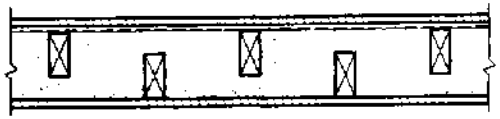
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

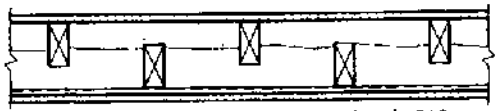
STAGGERED WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
RESILIENT CHANNELS @ 610 mm

◇——◇ (STC 53)
140 mm BLOWN-IN CELLULOSE (22.9 kg/m³)



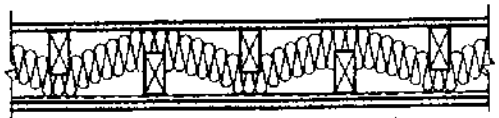
G16_RC13(610)_SWS140(406)_CFL140_G16
(TL-93-328)

□——□ (STC 52)
40 mm SPRAYED CELLULOSE (70.0 kg/m³)



G16_SWS140(406)_CFS40_RC13(610)_G16
(TL-93-244)

○——○ (STC 51)
90 mm GLASS FIBER (WOVEN) (12.2 kg/m³)



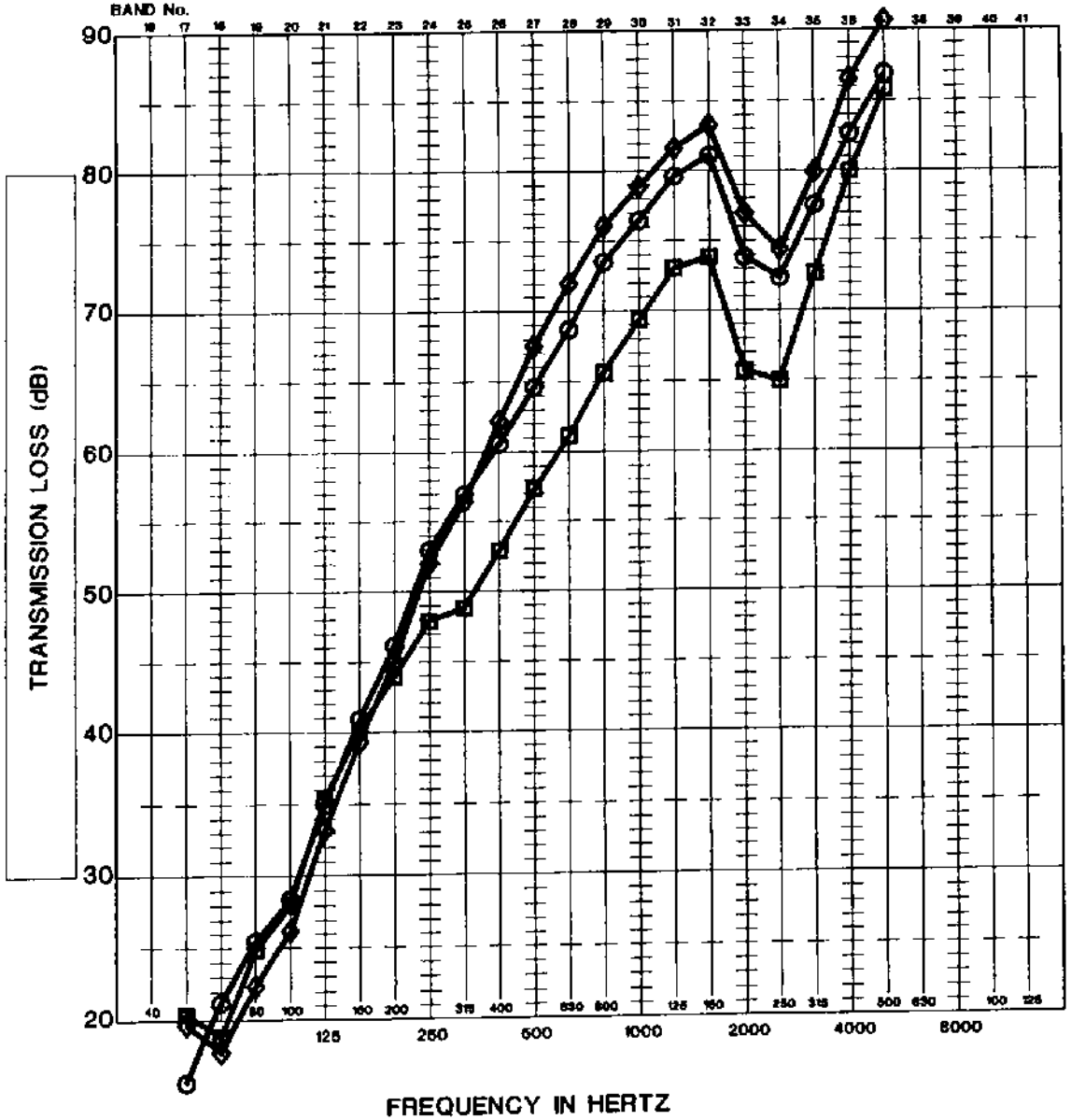
G16_SWS140(406)_GFB90_RC13(610)_G16
(TL-93-214)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 114	**FILE NAME** 177GRA114
PROJECT NUMBER 177.011	**DATE** 2001 12

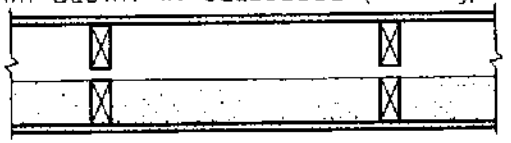
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

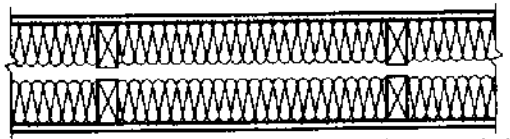
DOUBLE WOOD STUDS @ 610 mm
16mm TYPE 'X' GYPSUM BOARDS

◇——◇ (STC 57)
90 mm BLOWN-IN CELLULOSE (71.1 lg/m³)



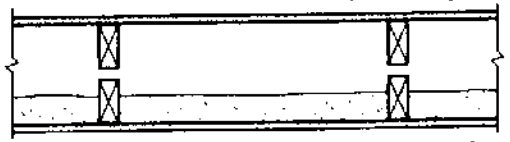
G16_WS90(610)_AIR25_WS90(610)_CFL90_G16
(TL-93-295)

○——○ (STC 59)
90 mm + 90 mm GLASS FIBER (13.3 kg/m³)



G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G16
(TL-93-281)

□——□ (STC 58)
60 mm SPRAYED CELLULOSE (65.0 kg/m³)



G16_WS90(610)_AIR25_WS90(610)_CFS60_G16
(TL-93-311)

PROJECT DESCRIPTION

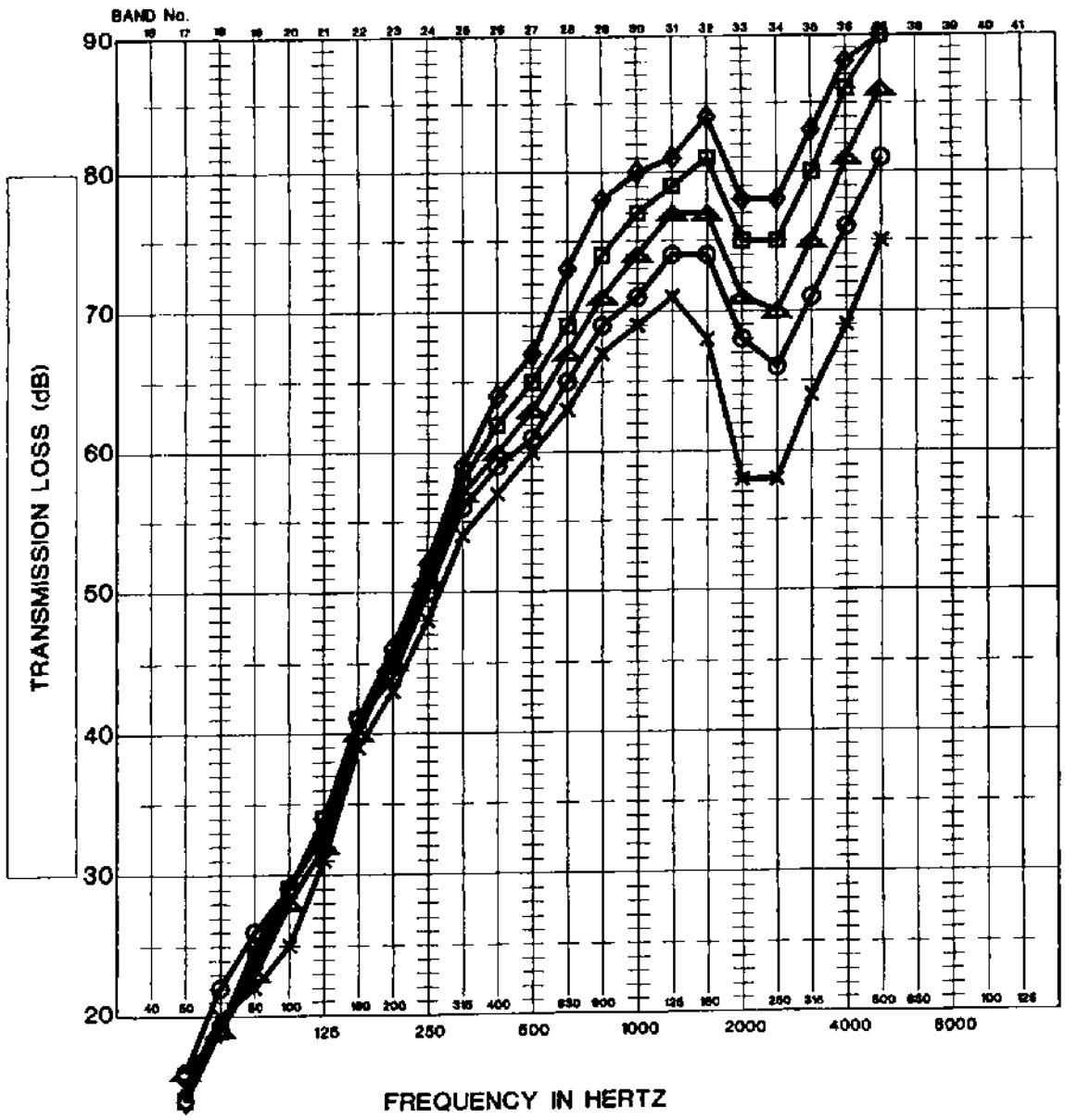
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 115	**FILE NAME** 177GRA115
PROJECT NUMBER 177.011	**DATE** 2001 12

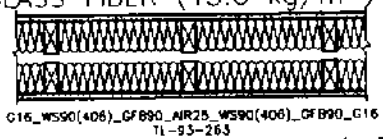
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



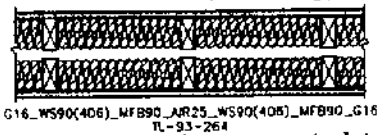
LEGEND

DOUBLE WOOD STUDS @ 406mm
16mm TYPE 'X' GYPSUM BOARDS

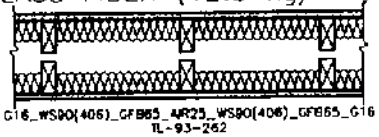
GLASS FIBER (15.6 kg/m³)
(STC 58)



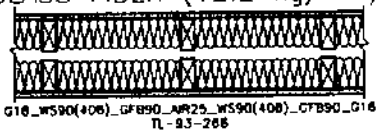
MINERAL FIBER (32.2 kg/m³)
(STC 57)



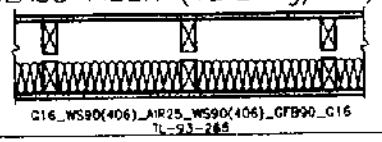
GLASS FIBER (12.3 kg/m³)
(STC 58)



GLASS FIBER (12.2 kg/m³)
(STC 56)



GLASS FIBER (12.2 kg/m³)
(STC 55)



PROJECT DESCRIPTION

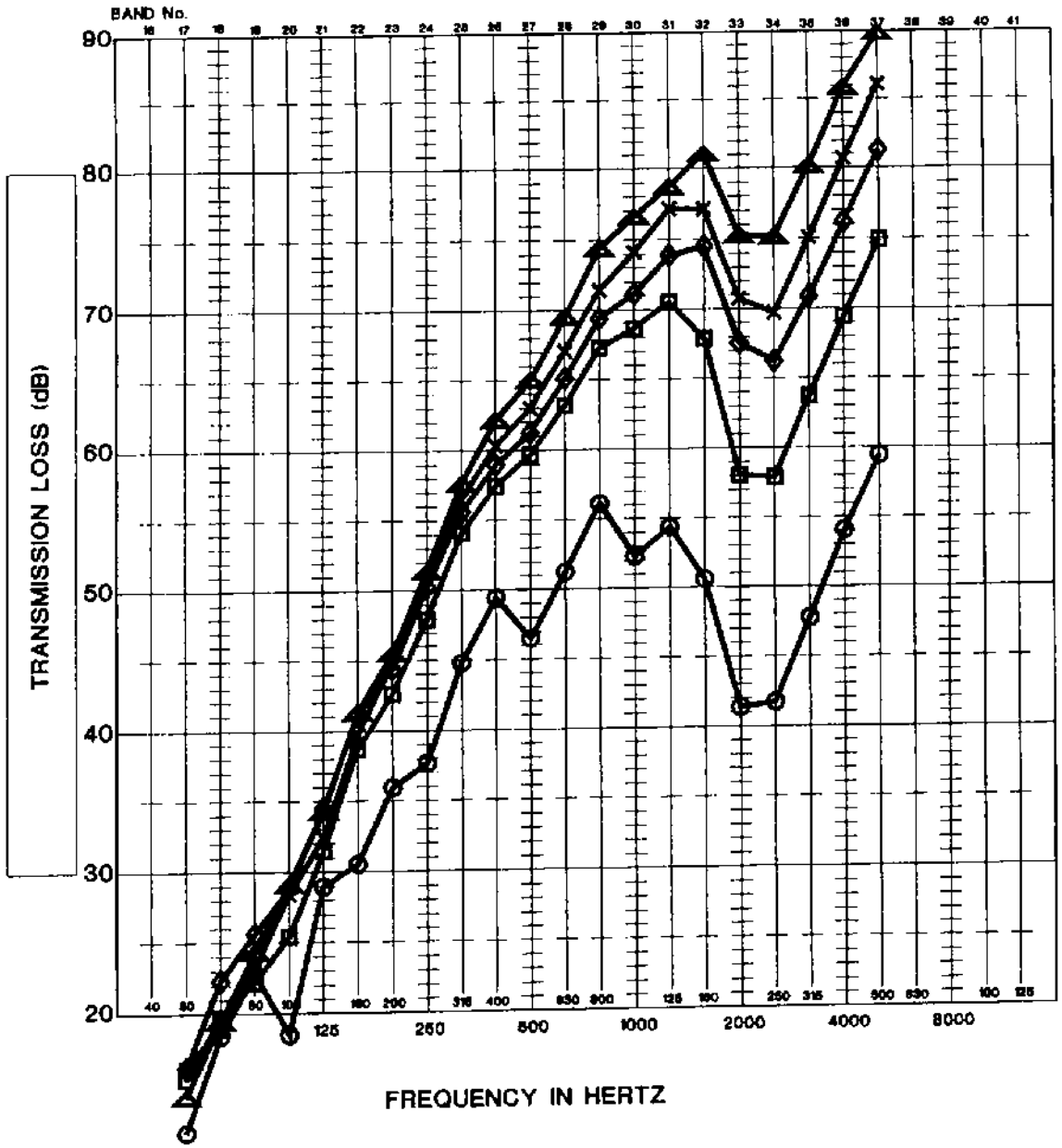
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF SOUND ABSORPTIVE MATERIALS

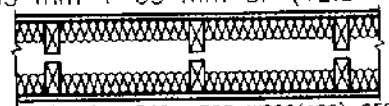
GRAPH NUMBER 116	**FILE NAME** 177GRA116
PROJECT NUMBER 177.011	**DATE** 2001 12

NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND DOUBLE WOOD STUDS @ 406mm
16 mm TYPE 'X' GYPSUM BOARDS

◇—◇ 65 mm + 65 mm GF (12.3 kg/m^3)
(STC 58)

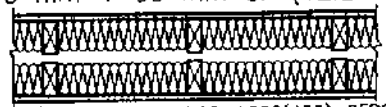


G16_WS90(406)_GFB65_AIR25_WS90(406)_GFB65_G16
(TL-93-262)

△—△ 90 mm + 90 mm GF (15.6 kg/m^3)
(STC 58)

G16_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G16
(TL-93-263)

×—× 90 mm + 90 mm GF (12.2 kg/m^3)
(STC 56)



G16_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G16
(TL-93-266)

□—□ 90 mm GF (12.2 kg/m^3)
(STC 55)

G16_WS90(406)_AIR25_WS90(406)_GFB90_G16
(TL-93-265)

○—○ EMPTY CAVITY
(STC 45)

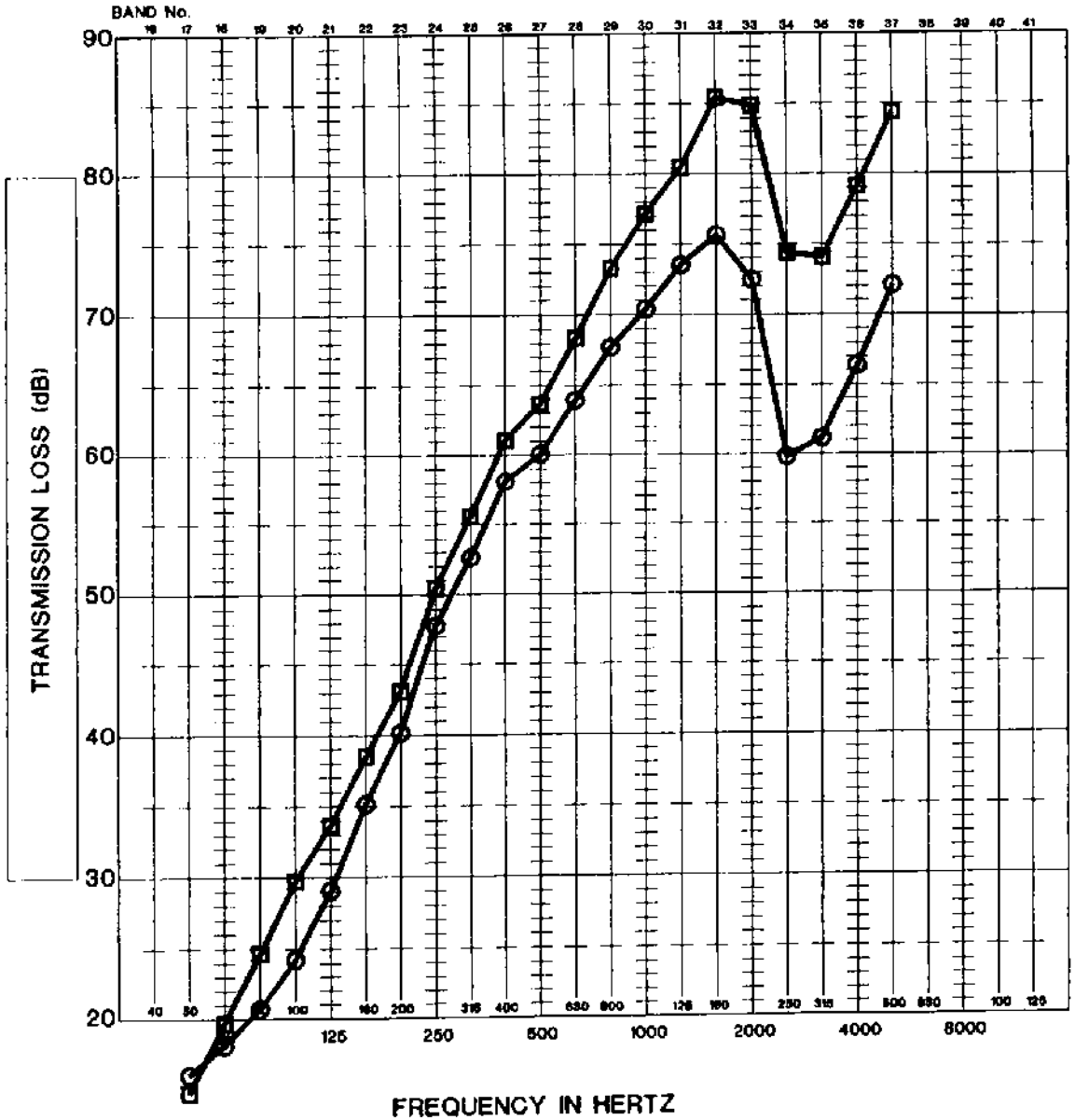
G16_WS90(406)_AIR25_WS90(406)_G16
(TL-93-261)

PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 117	**FILE NAME** 177GRA117
PROJECT NUMBER 177 011	**DATE** 2001 12

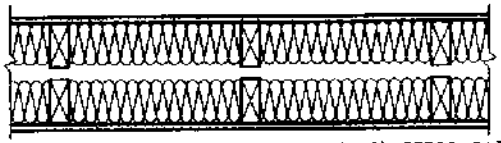
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

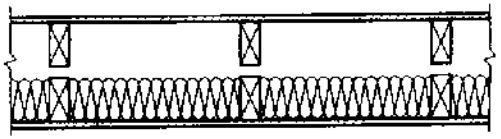
DOUBLE WOOD STUDS @ 406 mm
13 mm TYPE "X" GYPSUM BOARDS
GLASS FIBER INSULATION (12.2 kg/m^3)

(STC 58)
TWO GLASS FIBER BATTS



G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G13
(TL-93-270)

(STC 53)
ONE GLASS FIBER BATT



G13_WS90(406)_AIR25_WS90(406)_GFB90_G13
(TL-93-279)

PROJECT DESCRIPTION

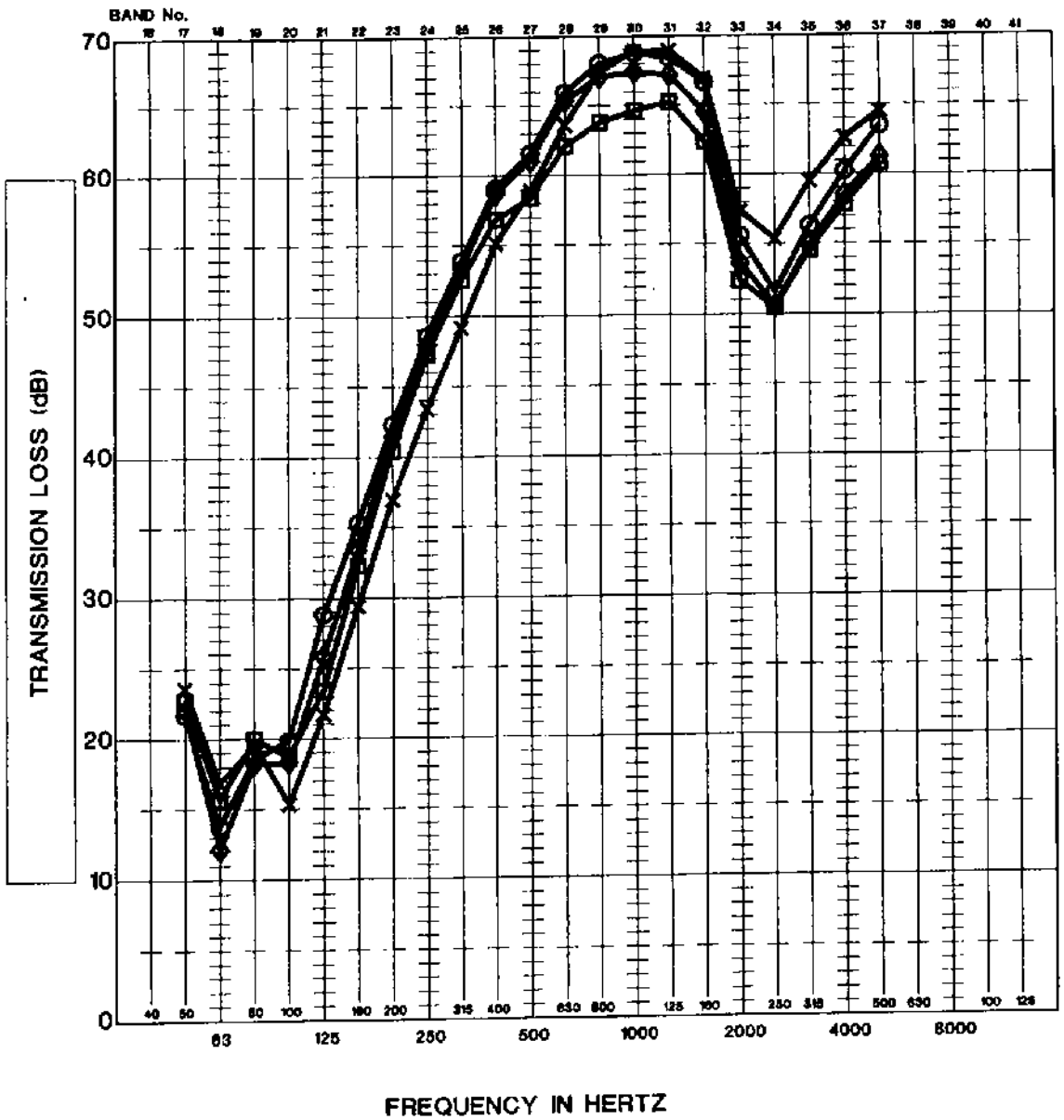
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

ONE BATT VERSUS TWO BATTS OF GLASS FIBER INSULATION IN A DOUBLE WOOD STUD PARTITION

GRAPH NUMBER 118	**FILE NAME** 177GRA118
PROJECT NUMBER 177 011	**DATE** 2001 12

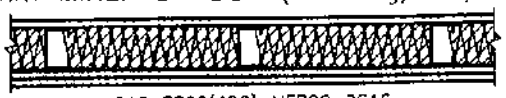
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

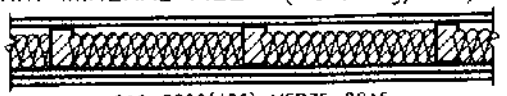
STEEL STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
MINERAL FIBER INSULATION (M1)

(STC 53)
90 mm MINERAL FIBER (35.5 kg/m³)



G16_SS90(406)_MFB90_2G16
(TL-93-329)

(STC 50)
75 mm MINERAL FIBER (49.3 kg/m³)

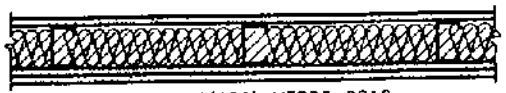


G16_SS90(406)_MFB75_2G16
(TL-93-333)

(STC 47)
40 mm MINERAL FIBER (52.5 kg/m³)

G16_SS90(406)_MFB40_2G16
(TL-93-341)

(STC 46)
83 mm MINERAL FIBER (98.8 kg/m³)



G16_SS90(406)_MFB83_2G16
(TL-93-337)

PROJECT DESCRIPTION

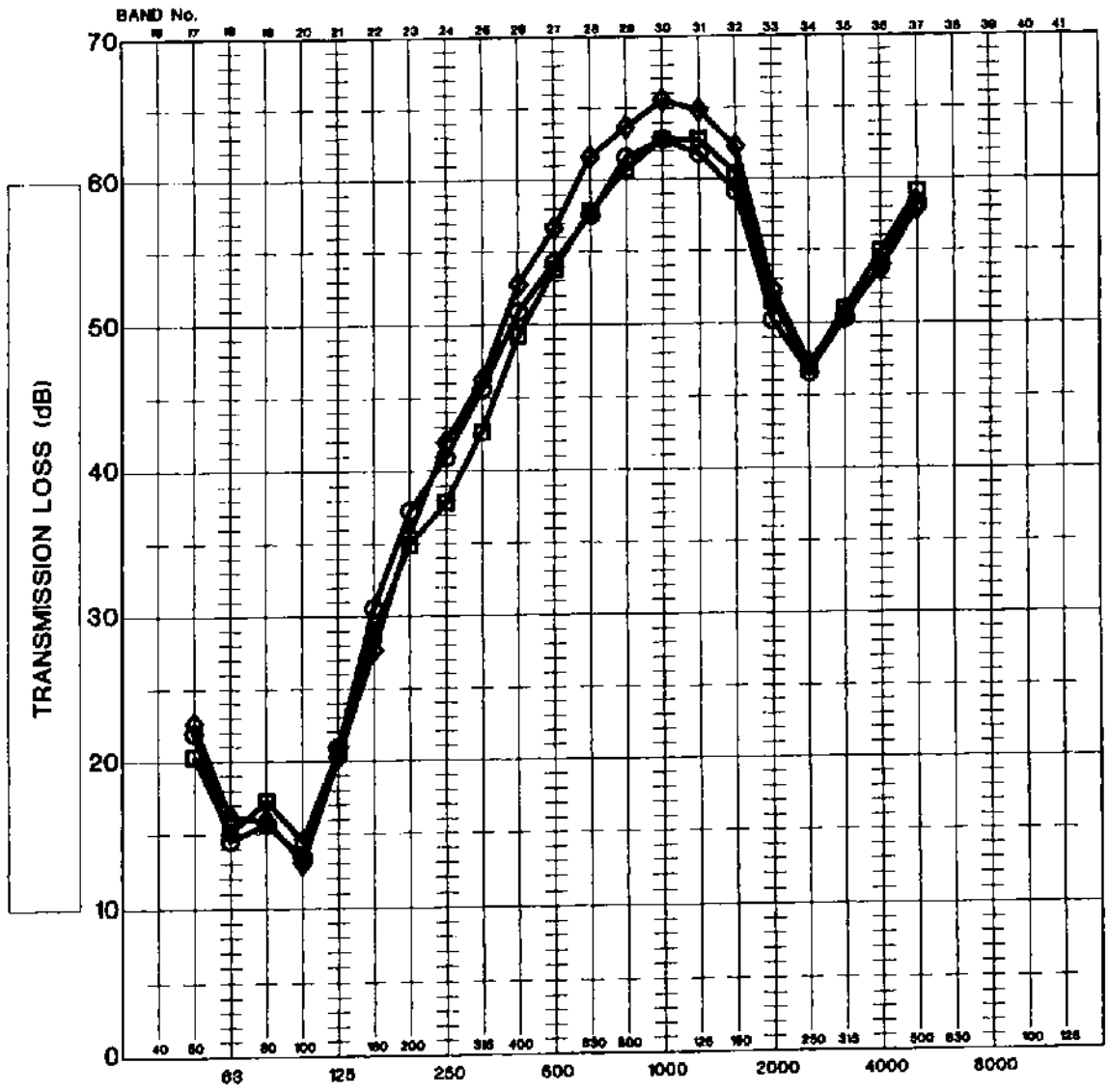
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 119	**FILE NAME:** 177GRA119
PROJECT NUMBER 177.011	**DATE** 2001 12

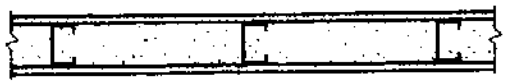
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS

(STC 44)
90 mm BLOWN-IN CELLULOSE (45.6 kg/m^3)



G16_SS90(406)_CFL90_G16
(TL-92-438)

(STC 45)
40 mm SPRAYED CELLULOSE (52.5 kg/m^3)

G16_SS90(406)_CFS40_G16
(TL-92-439)

(STC 45)
90 mm SPRAYED CELLULOSE (45.6 kg/m^3)

G16_SS90(406)_CFS90_G16
(TL-93-049)

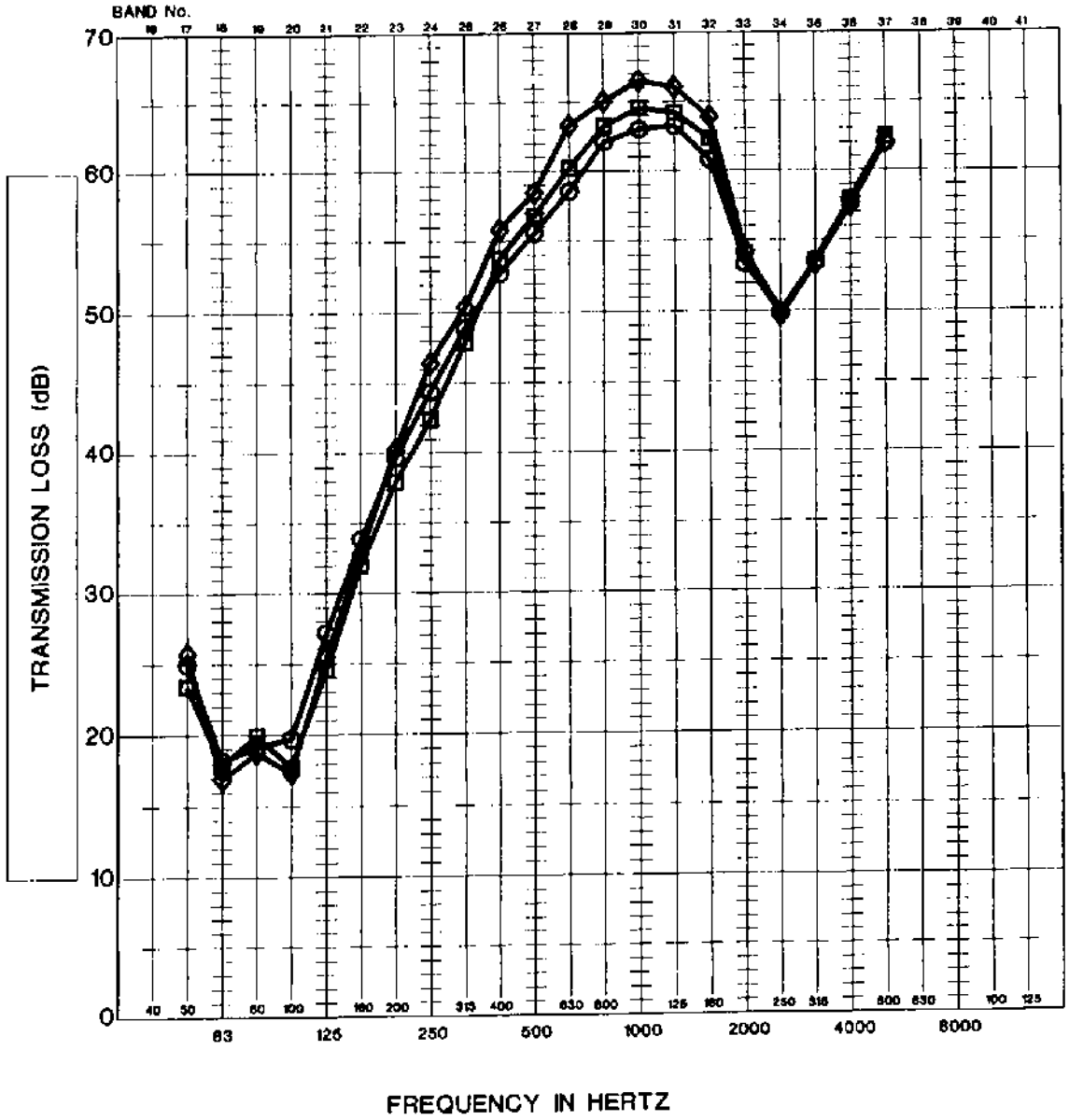
PROJECT DESCRIPTION
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE
COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 120	**FILE NAME** 177GRA120
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

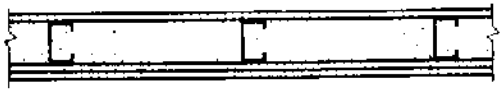
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

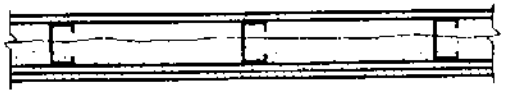
STEEL STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS

◇——◇ (STC 49)
90 mm BLOWN-IN CELLULOSE (45.6 kg/m^3)



G16_SS90(406)_CFL90_2G16
(TL-92-437)

○——○ (STC 51)
40 mm SPRAYED CELLULOSE (52.5 kg/m^3)



G16_SS90(406)_CFS40_2G16
(TL-92-440)

□——□ (STC 49)
90 mm SPRAYED CELLULOSE (45.6 kg/m^3)

G16_SS90(406)_CFS90_2G16
(TL-93-050)

PROJECT DESCRIPTION

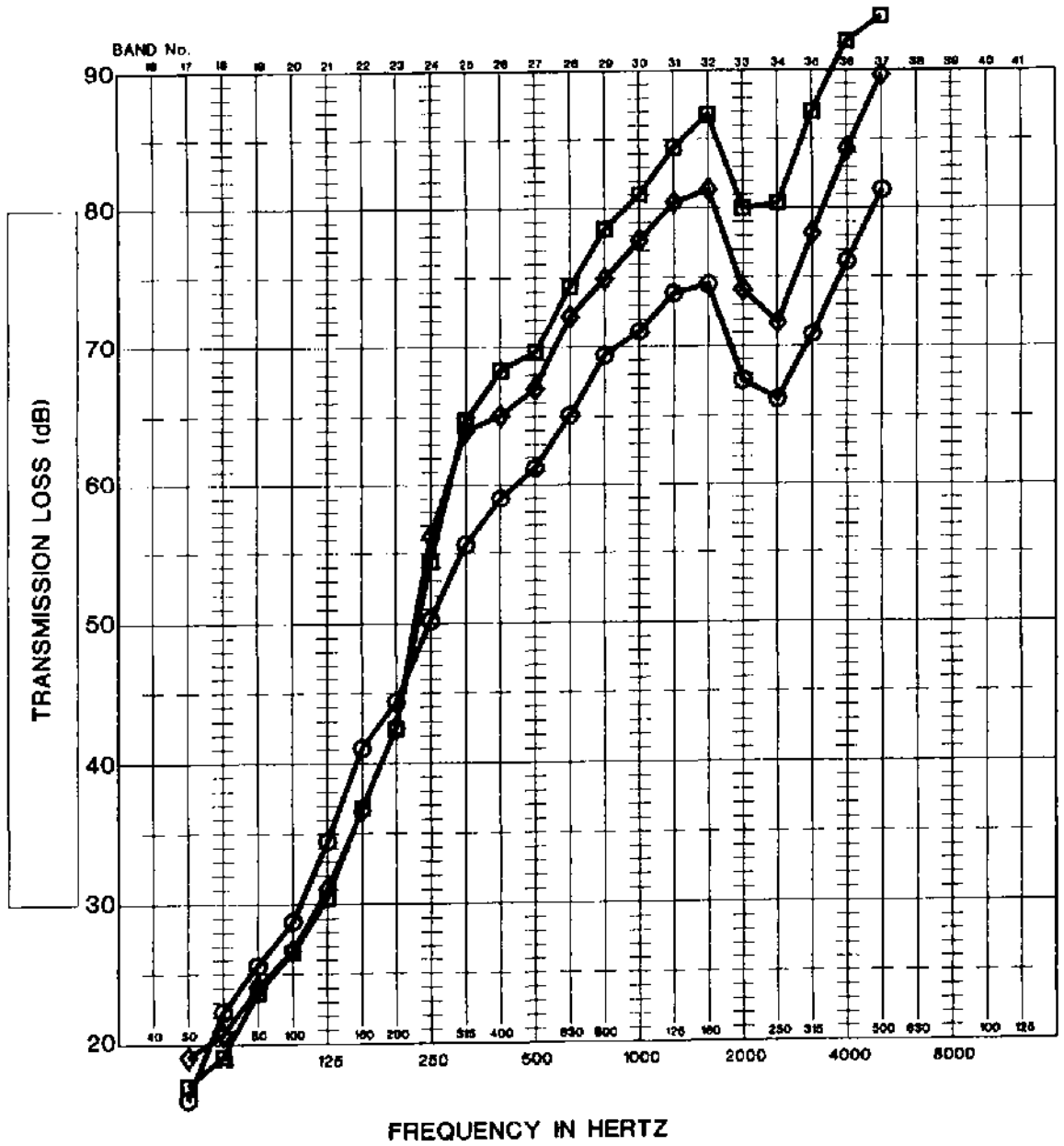
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON OF SOUND ABSORPTIVE MATERIALS

GRAPH NUMBER 121	**FILE NAME:** 177GRA121
PROJECT NUMBER 177.011	**DATE** 2001 12

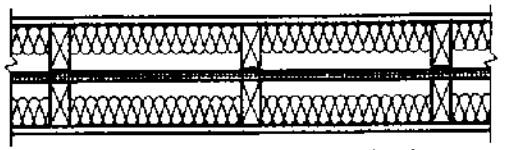
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

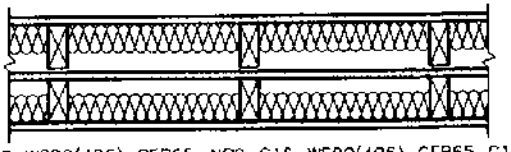
DOUBLE WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 54)
FIBER BOARD 19mm IN GAP



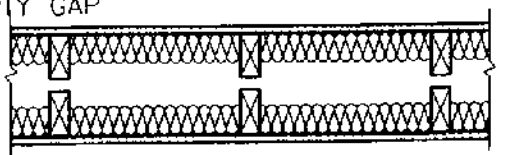
G16_WS90(406)_GFB65_AIR6_WFB19_WS90(406)_GFB65_G16
(TL 93-280)

(STC 55)
16mm TYPE 'X' GYPSUM BOARD IN GAP



G16_WS90(406)_GFB65_AIR9_G16_WS90(406)_GFB65_G16
(TL-93-297)

(STC 58)
EMPTY GAP



G16_WS90(406)_GFB65_AIR25_WS90(406)_GFB65_G16
(TL-93-262)

PROJECT DESCRIPTION

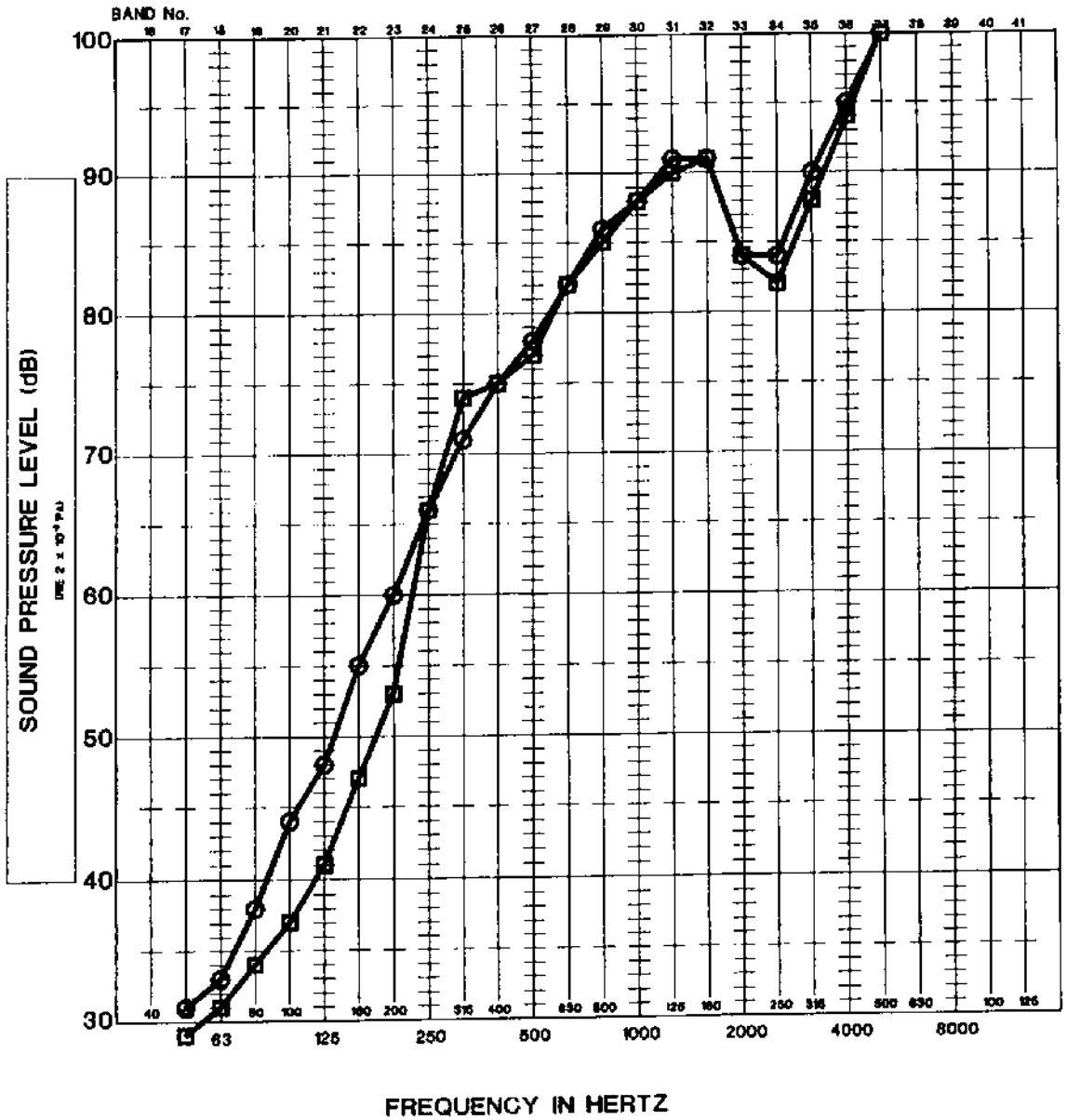
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING A MATERIAL IN BETWEEN A DOUBLE STUD WALL PARTITION

GRAPH NUMBER 122	**FILE NAME** 177GRA122
PROJECT NUMBER 177 011	**DATE** 2001 12

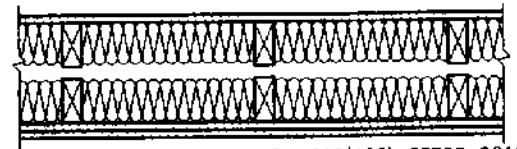
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

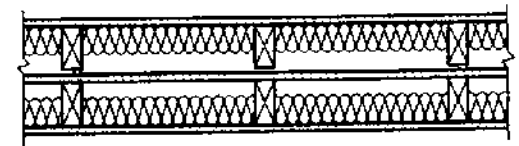
DOUBLE WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

O——O (STC 62)
EMPTY GAP (STC 62)



G16_WS90(406)_GF890_AIR25_WS90(406)_GFB90_2G16
(TL-93-267)

□——□ (STC 55)
16 mm TYPE 'X' BOARD IN GAP (STC 55)



G16_WS90(406)_GFB65_AIR9_G16_WS90(406)_GFB65_G16
(TL-93-297)

PROJECT DESCRIPTION

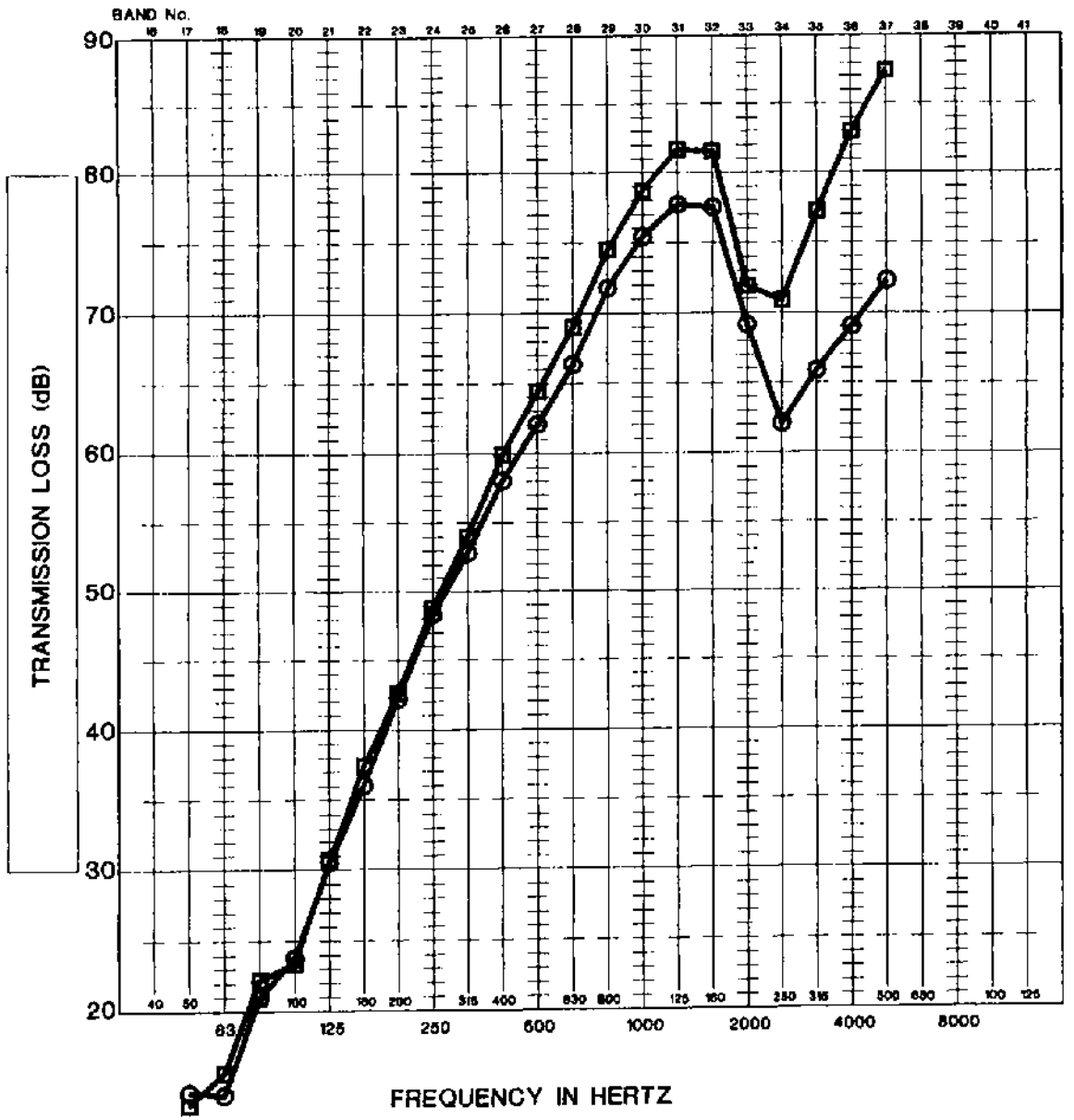
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

THE EFFECTS OF ADDING A BOARD IN BETWEEN A DOUBLE STUD WALL PARTITION

GRAPH NUMBER 123	**FILE NAME** 177GRA123
PROJECT NUMBER 177.011	**DATE** 2001 12

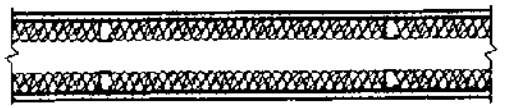
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

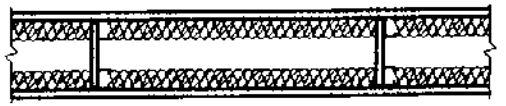
DOUBLE STEEL STUDS @ 610 mm
16 mm TYPE "X" GYPSUM BOARDS

(STC 55)
65 mm AIR GAP - WITHOUT GUSSETS



G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_G16
(TL-93-310)

(STC 54)
65 mm AIR GAP - WITH GUSSETS



G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_G16
(TL-93-309)

PROJECT DESCRIPTION

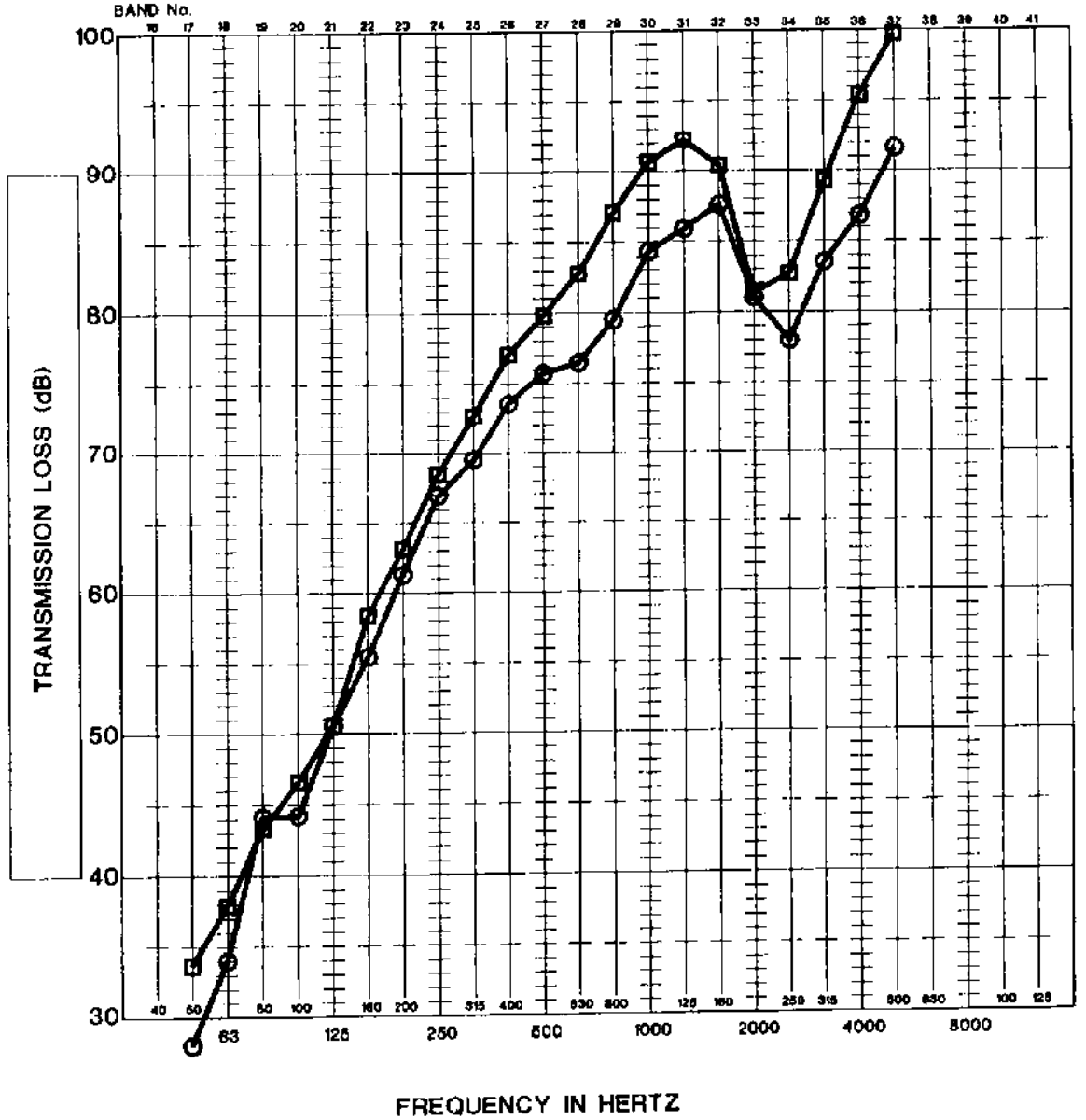
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECT OF ADDING GUSSETS TO A STEEL STUD PARTITION

GRAPH NUMBER 124	**FILE NAME** 177GRA124
PROJECT NUMBER 177 011	**DATE** 2001 12

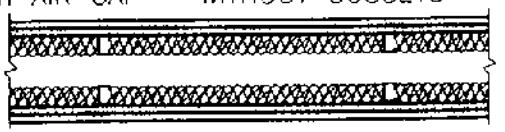
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

DOUBLE STEEL STUDS @ 610 mm
16 mm TYPE "X" GYPSUM BOARDS

(STC 65)
65mm AIR GAP – WITHOUT GUSSETS



2G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_2G16
(TL-93-320)

(STC 65)
65mm AIR GAP – WITH GUSSETS

2G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_2G16
(TL-93-321)

PROJECT DESCRIPTION

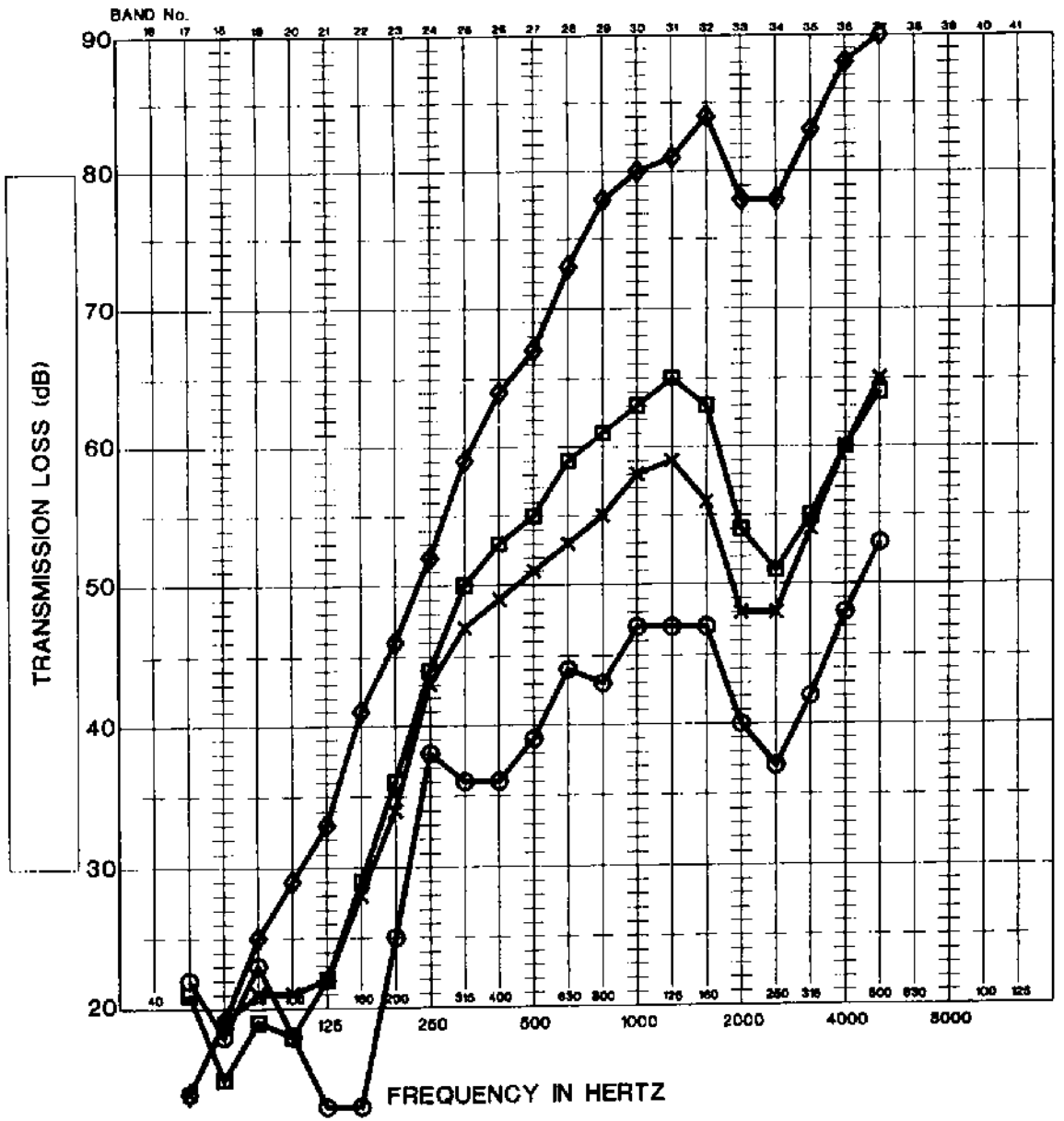
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

EFFECT OF ADDING GUSSETS TO A STEEL STUD WALL

GRAPH NUMBER 125	**FILE NAME** 177GRA125
PROJECT NUMBER 177.011	**DATE** 2001 12

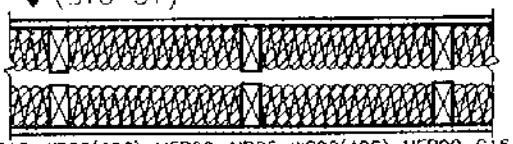
NOTE: THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
MINERAL FIBER INSULATION

◇ (STC 57)

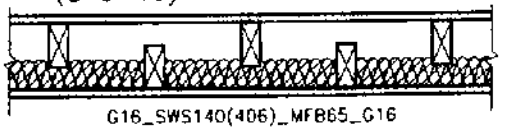


G16_WS90(406)_MFB90_AIR25_WS90(406)_MFB90_G16
(TL-93-264)

□ (STC 46)

G16_WS90(406)_MFB90_RC13(610)_G16
(TL-93-156)

× (STC 46)



G16_SWS140(406)_MFB65_G16
(TL-93-253)

○ (STC 34)

G16_WS90(406)_MFB90_G16
(TL-93-157)

PROJECT DESCRIPTION

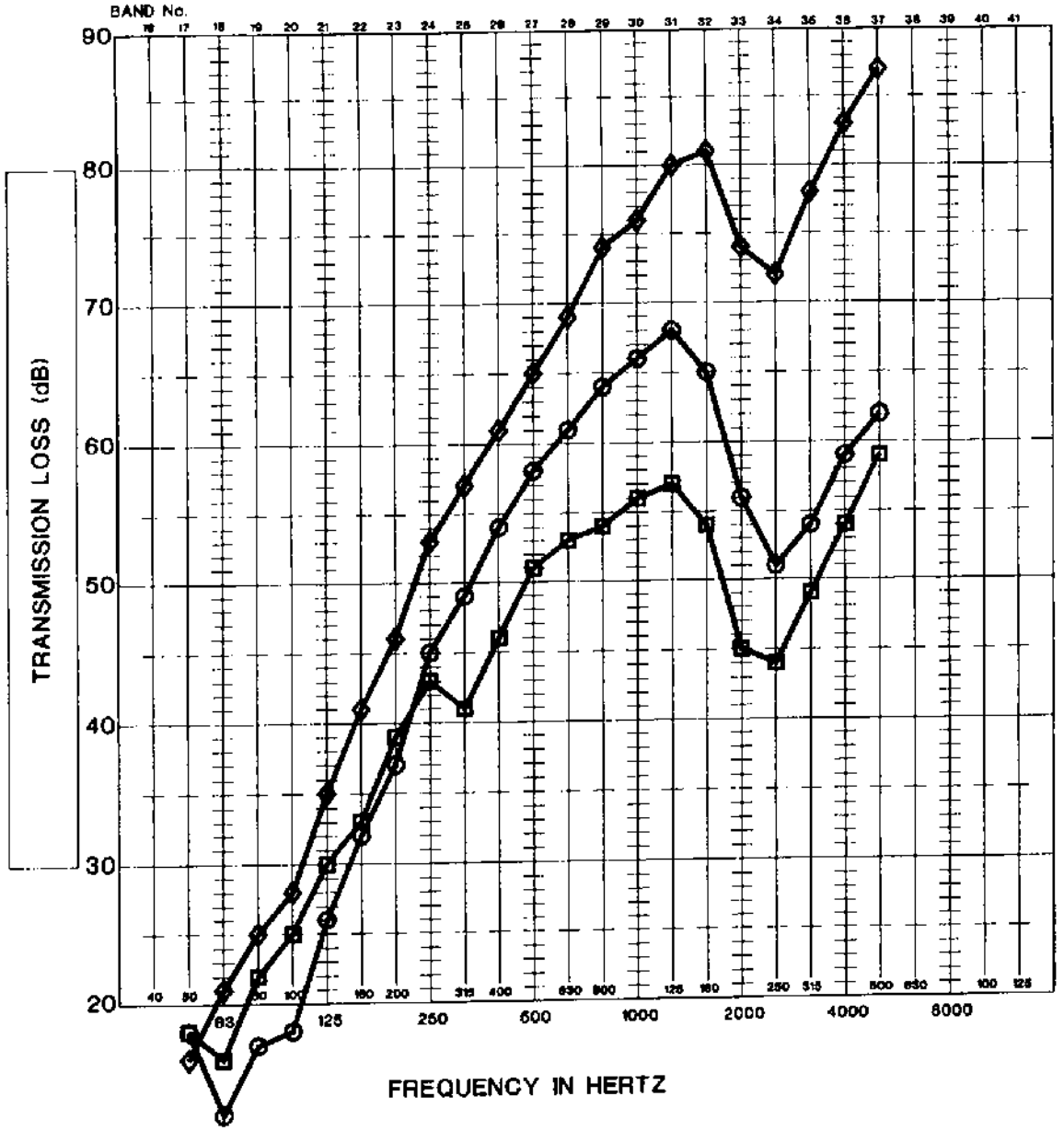
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN SINGLE, STAGGERED AND DOUBLE STUD PARTITIONS

GRAPH NUMBER 126	**FILE NAME** 177GRA126
PROJECT NUMBER 177.011	**DATE** 2001 12

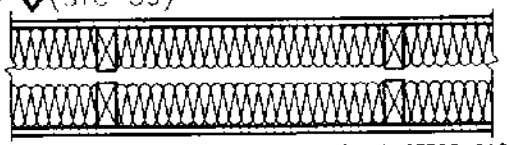
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

◇—◇ (STC 59)

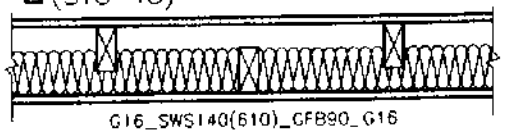


G16_WS90(610)_GFB90_AIR25_WS90(610)_GFB90_G16
(TL-93-281)

○—○ (STC 50)

G16_WS90(610)_GFB90_RC13(610)_G16
(TL-93-197)

□—□ (STC 48)



G16_SWS140(610)_GFB90_G16
(TL-93-256)

PROJECT DESCRIPTION

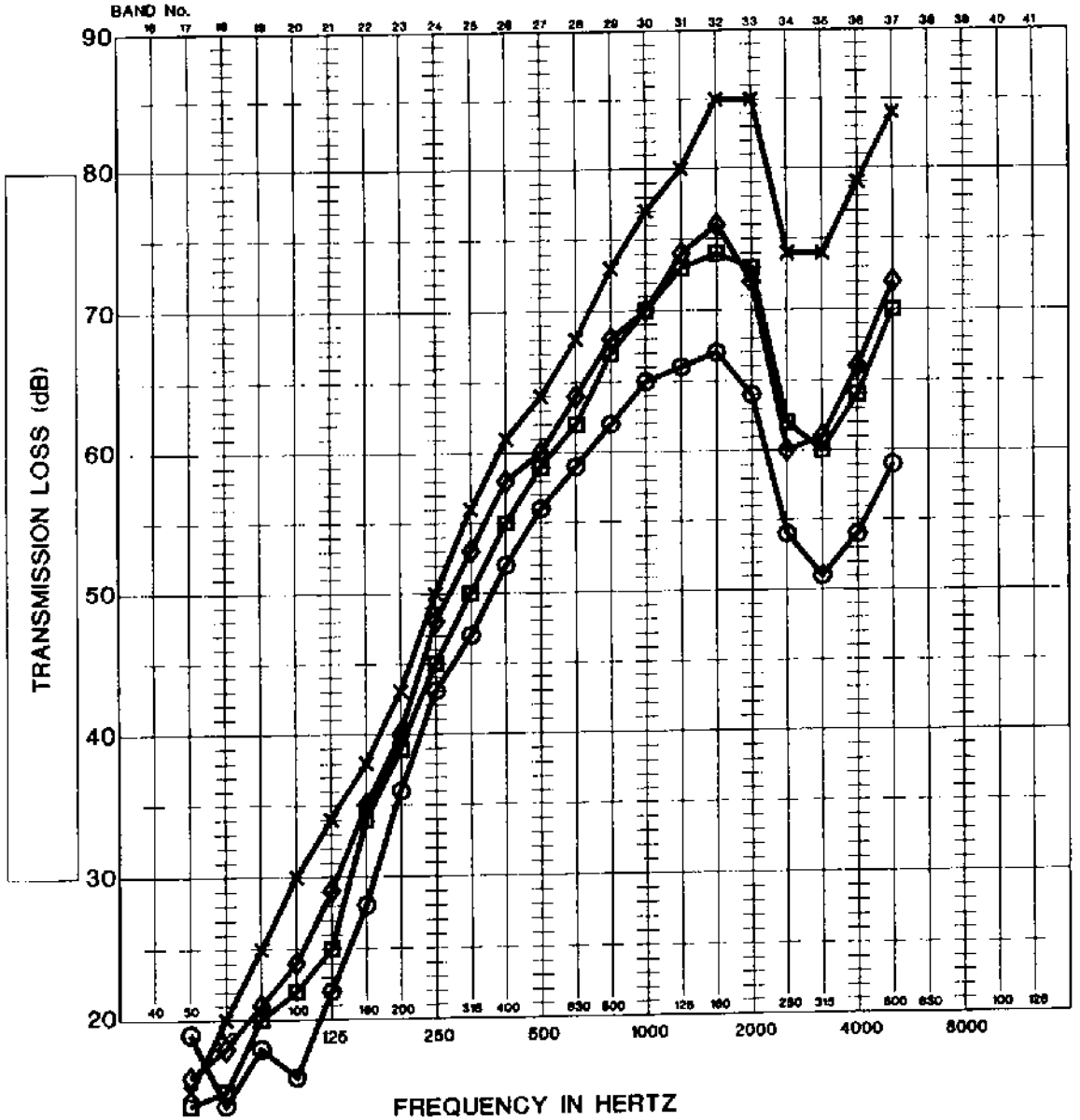
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN SINGLE, STAGGERED AND DOUBLE STUD PARTITIONS

GRAPH NUMBER 127	**FILE NAME** 177GRA127
PROJECT NUMBER 177 011	**DATE** 2001 12

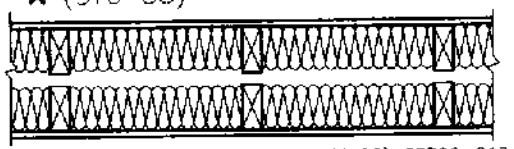
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
13 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 58)



G13_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G13
(TL-93-270)

(STC 49)

G13_SWS140(406)_GFB90_RC13(610)_G13
(TL-93-213)

(STC 46)

G13_WS90(406)_GFB90_RC13(610)_G13
(TL-93-178)

PROJECT DESCRIPTION

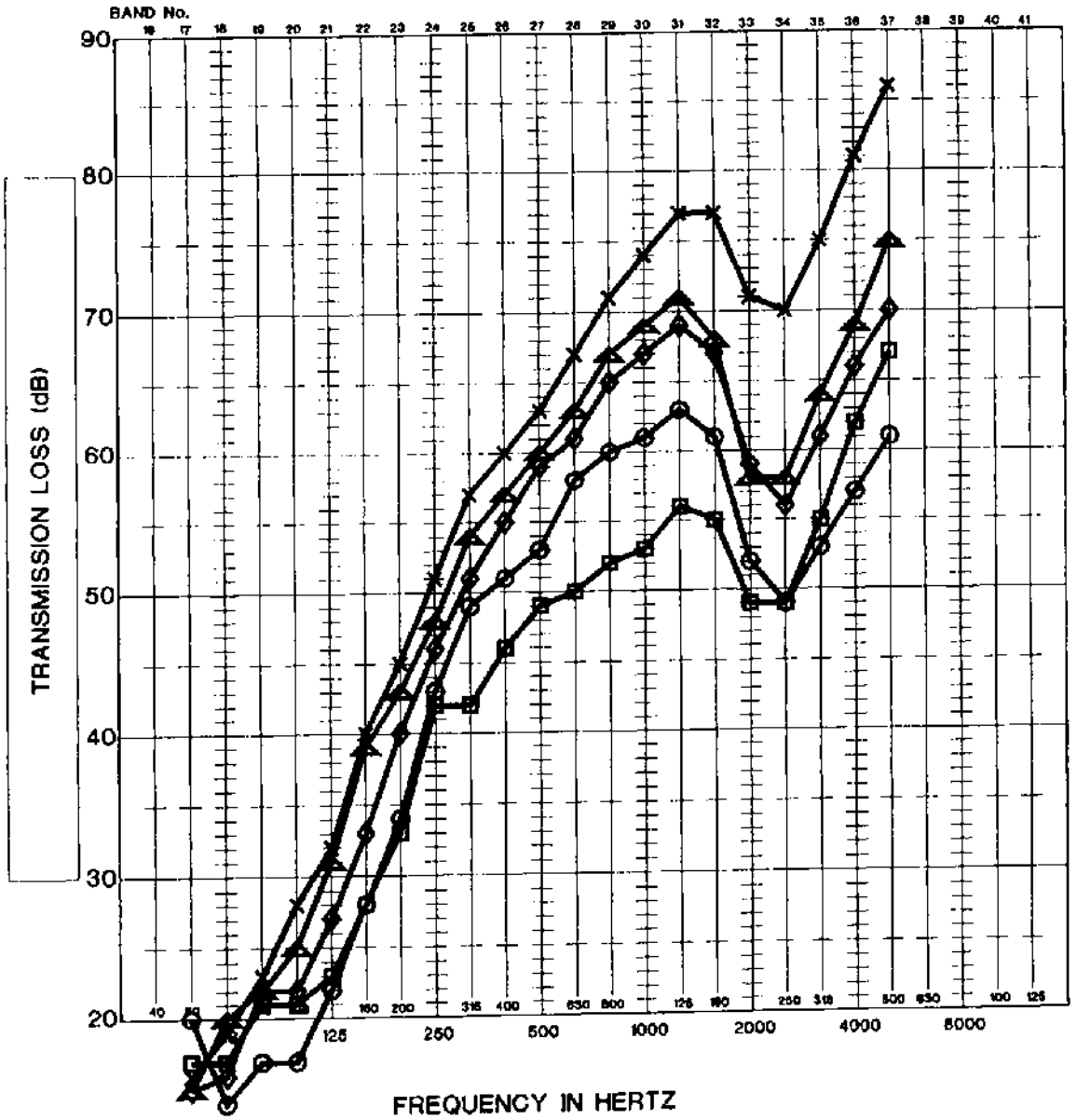
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN SINGLE, STAGGERED AND DOUBLE STUD PARTITIONS

GRAPH NUMBER 128	**FILE NAME:** 177GRA128
PROJECT NUMBER 177 011	**DATE** 2001 12

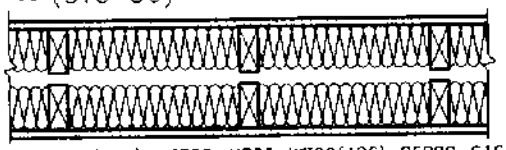
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

WOOD STUDS @ 406 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 56)



G16_WS90(406)_GFB90_AIR25_WS90(406)_GFB90_G16
(TL-93-266)

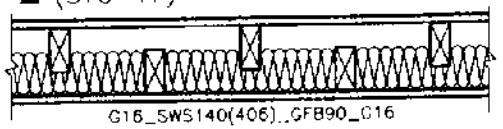
(STC 51)

G16_SWS140(406)_GFB90_RC13(610)_G16
(TL-93-214)

(STC 46)

G16_WS90(406)_GFB90_RC13(406)_G16
(TL-93-113)

(STC 47)



G16_SWS140(406)_GFB90_G16
(TL-93-225)

PROJECT DESCRIPTION

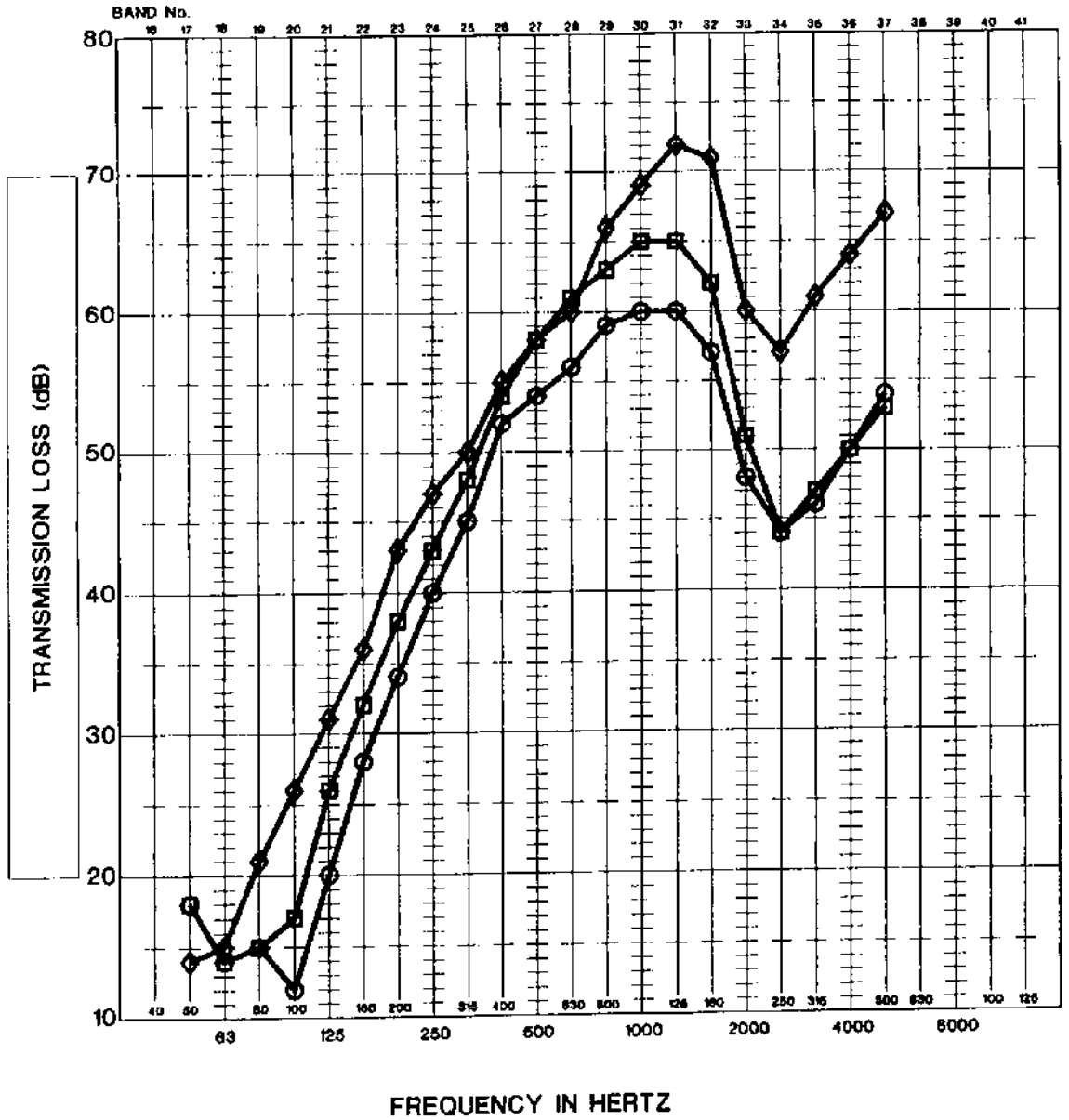
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN SINGLE, STAGGERED AND DOUBLE STUD PARTITIONS

GRAPH NUMBER 129	**FILE NAME** 177GRA129
PROJECT NUMBER 177011	**DATE** 2001 12

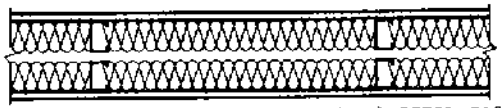
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

(STC 55)

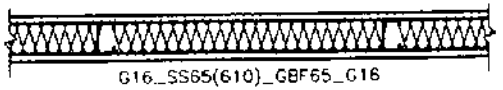


G16_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_G16
(TL-93-300)

(STC 48)

G16_SS90(610)_GFB90_G16
(TL-92-348)

(STC 44)



G16_SS65(610)_GBF65_G16
(TL-93-073)

PROJECT DESCRIPTION

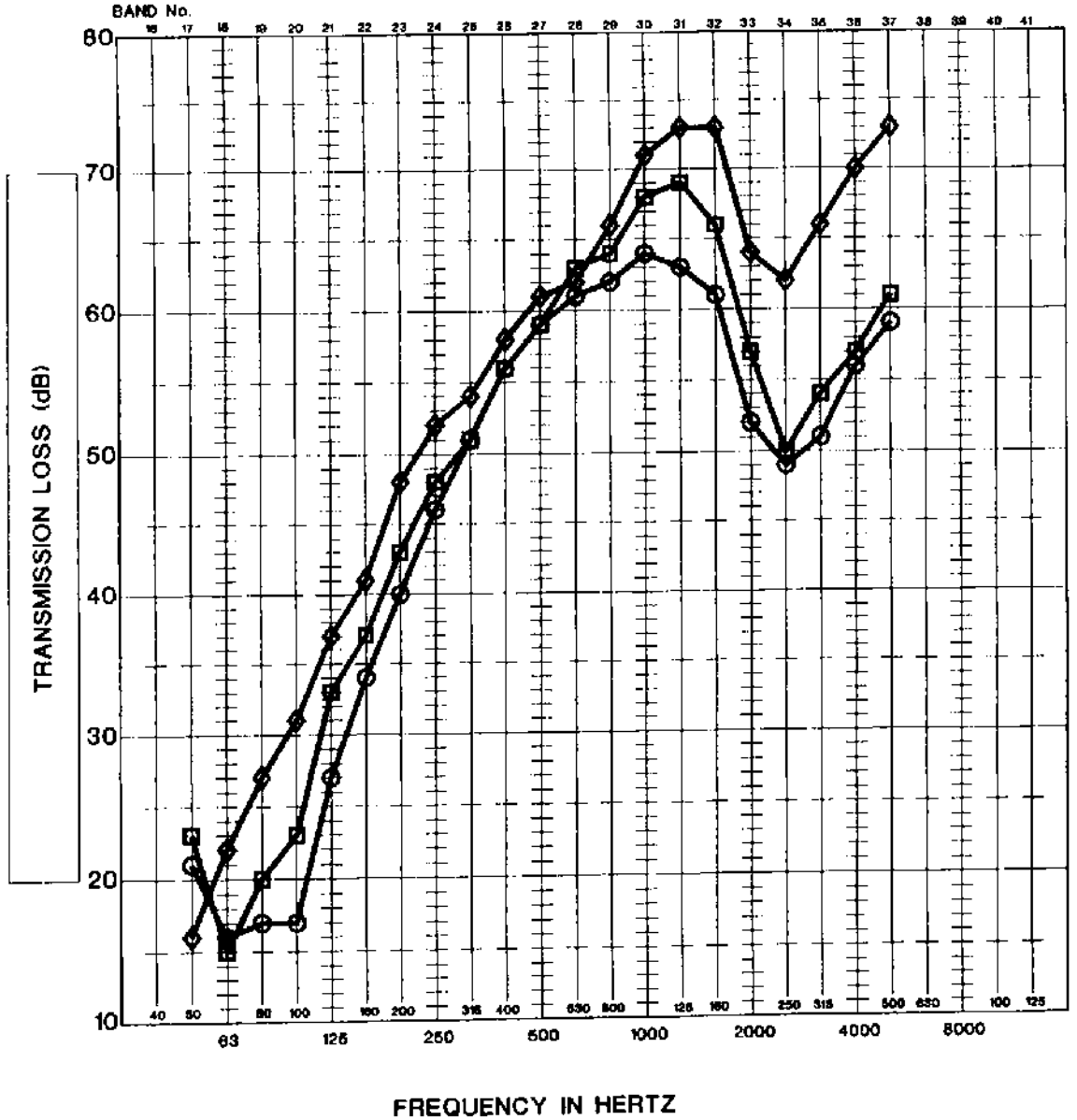
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN SINGLE AND DOUBLE STUD PARTITIONS

GRAPH NUMBER 130	**FILE NAME** 177GRA130
PROJECT NUMBER 177 011	**DATE** 2001 12

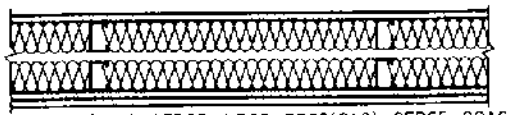
NOTE. THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

◇——◇ (STC 61)



G16_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_2G16
(TL-93-301)

□——□ (STC 54)

G16_SS90(610)_GFB90_2G16
(TL-92-368)

○——○ (STC 51)

G16_SS65(610)_GFB65_2G16
(TL-93-036)

PROJECT DESCRIPTION

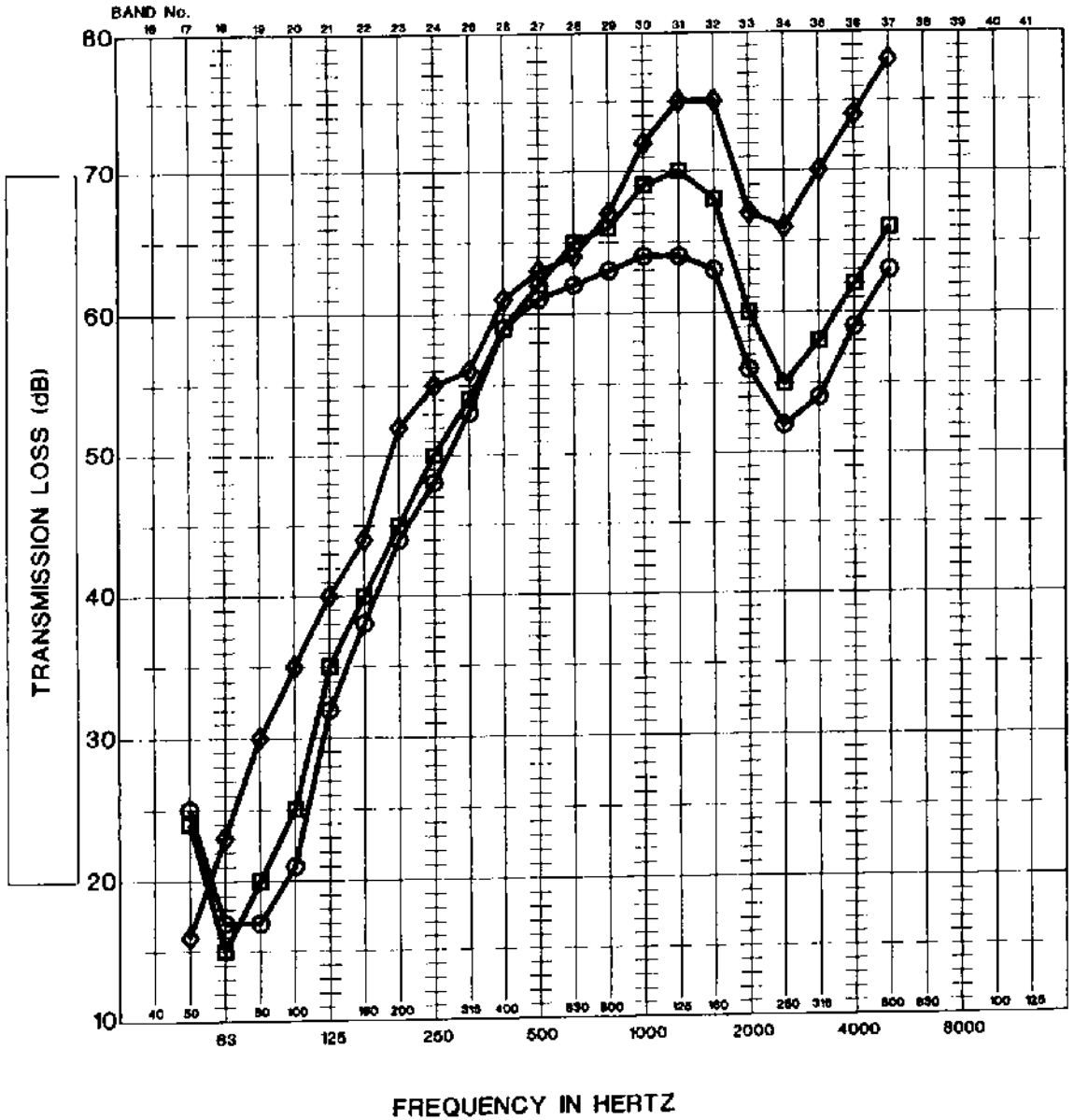
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN SINGLE AND DOUBLE STUD PARTITIONS

GRAPH NUMBER 131	**FILE NAME** 177GRA131
PROJECT NUMBER 177 011	**DATE** 2001 12

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
GLASS FIBER INSULATION (G1)

◆ (STC 64)

2G16_SS65(610)_GFB65_AIR20_SS65(610)_GFB65_2G16
(IL-93-302)

□ (STC 58)

2G16_SS90(610)_GFB90_2G16
(IL-92-369)

○ (STC 55)

2G16_SS65(610)_GFB65_2G16
(93-037)

PROJECT DESCRIPTION

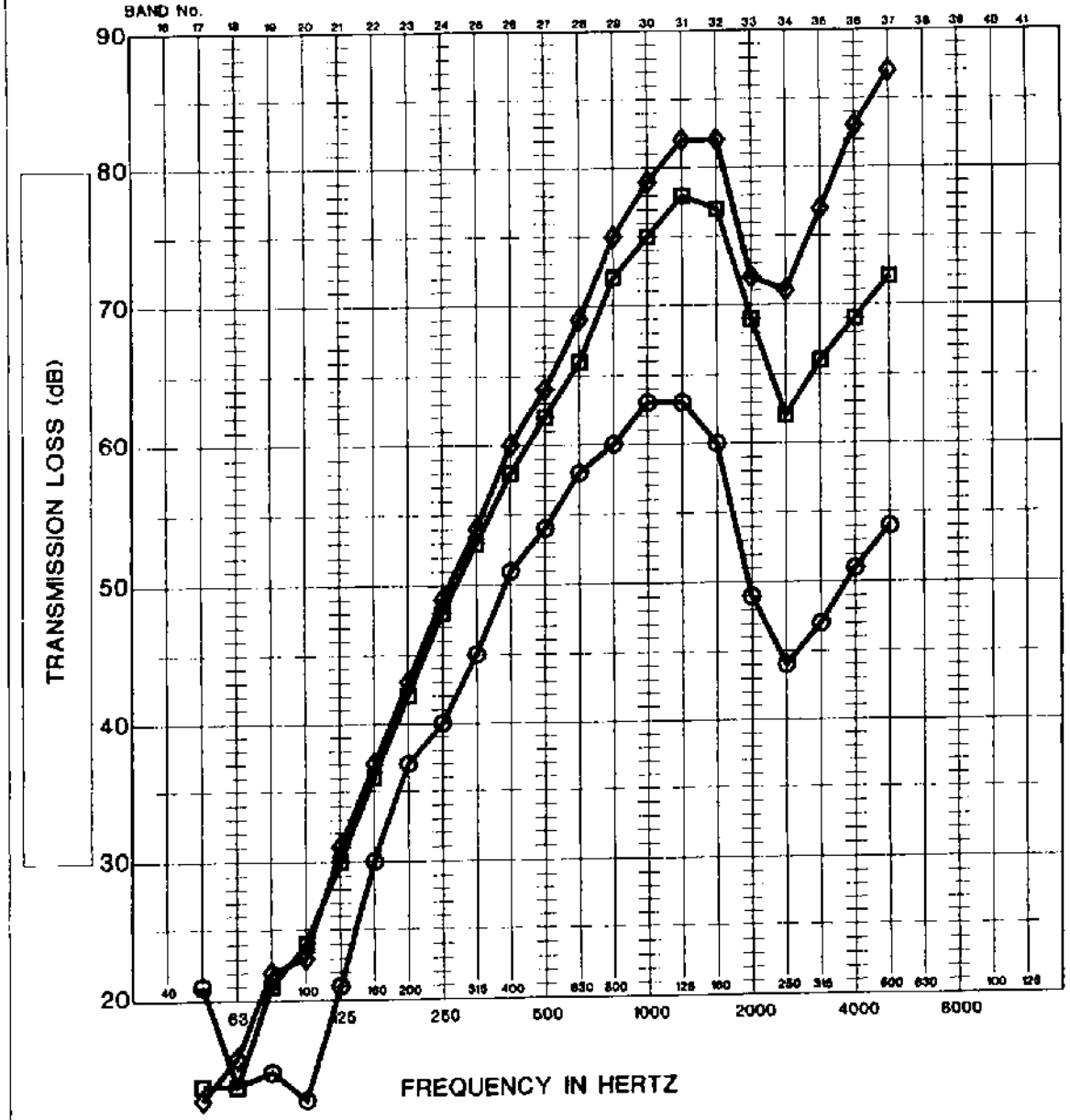
NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN SINGLE AND DOUBLE STUD PARTITIONS

GRAPH NUMBER 132	**FILE NAME** 177GRA132
PROJECT NUMBER 177 011	**DATE** 2001 12

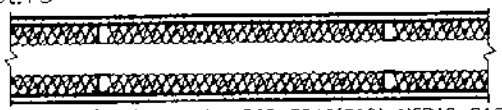
NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

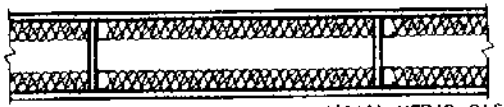
STEEL STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
MINERAL FIBER INSULATION

◇——◇ (STC 55)
DOUBLE STEEL STUDS WITHOUT GYPSUM GUSSETS



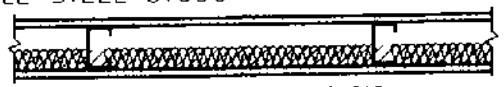
G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_G16
(TL 93-310)

□——□ (STC 54)
DOUBLE STEEL STUDS WITH GYPSUM GUSSETS



G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_G16
(TL-93-309)

○——○ (STC 45)
SINGLE STEEL STUDS



G16_SS90(610)_MFB40_G16
(TL-92-396)

PROJECT DESCRIPTION

NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

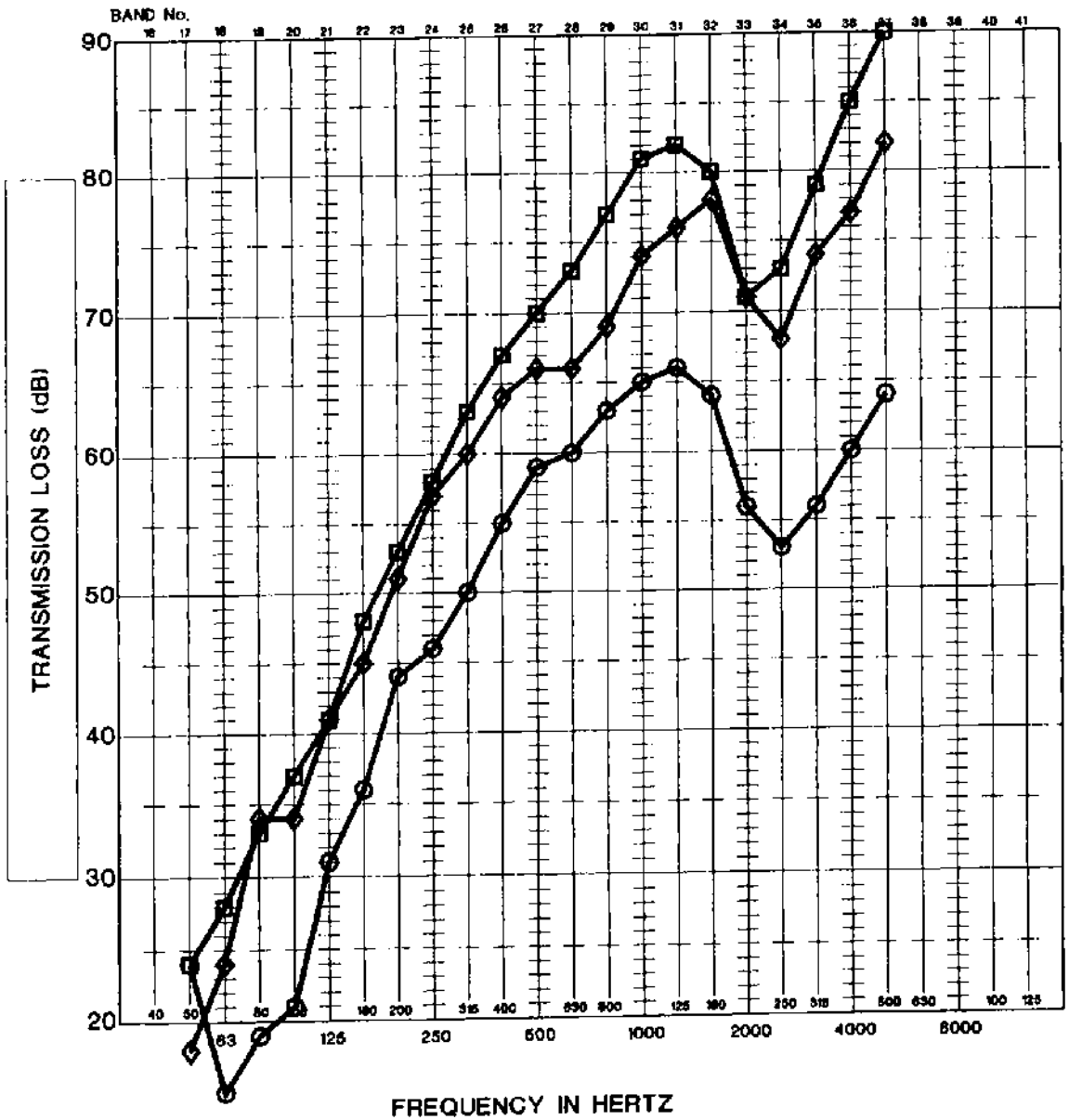
GRAPH TITLE

COMPARISON BETWEEN SINGLE AND DOUBLE STUD PARTITIONS WITH AND WITHOUT GUSSETS

GRAPH NUMBER 133	**FILE NAME** 177GRA133
PROJECT NUMBER 177.011	**DATE** 2001 12

mjm

NOTE THIS GRAPH ALONE DOES NOT REPRESENT A COMPLETE REPORT



LEGEND

STEEL STUDS @ 610 mm
16 mm TYPE 'X' GYPSUM BOARDS
MINERAL FIBER INSULATION

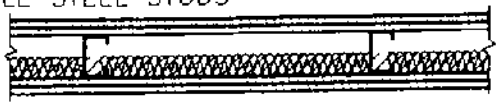
(STC 65)
DOUBLE STEEL STUDS WITHOUT GYPSUM GUSSETS

2G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_2G16
(TL-93-320)

(STC 65)
DOUBLE STEEL STUDS WITH GYPSUM GUSSETS

2G16_SS40(610)_MFB40_AIR65_SS40(610)_MFB40_2G16
(TL-93-321)

(STC 55)
SINGLE STEEL STUDS



2G16_SS90(610)_MFB40_2G16
(TL-93-398)

PROJECT DESCRIPTION

NOISE ISOLATION PROVIDED BY GYPSUM BOARD WALL ASSEMBLIES

GRAPH TITLE

COMPARISON BETWEEN SINGLE AND DOUBLE STUD PARTITIONS WITH AND WITHOUT GUSSETS

GRAPH NUMBER 134	**FILE NAME** 177GRA134
PROJECT NUMBER 177 011	**DATE** 2001 12

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