



Troy Acoustics Corporation

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How to Specify the Troy System™ for an Indoor Fixed Point Shooting Range

This paper will show you how to specify the patented Troy System™ for your commercial, club, or private, indoor shooting range. This is the same sound absorption, noise abatement system used by the US Navy SEALs, US Army Special Forces, the FBI, US Secret Service, and countless Federal, State and local law enforcement facilities.

Why Do I Need Acoustics?

Loud noise is hazardous to health! Intensely loud noise as found on shooting ranges is extremely hazardous to the health of anyone who shoots there. It also affects the people who work in the office or on your sales floor, and those shopping. There are also issues of Federal, State and local noise ordinances, and zoning regulations that could shut your range down.

Sound Sells

Shooting range acoustic treatment is good for your business. Reducing the noise will make your range attractive to women, families, and students. It will create the clean, comfortable, family friendly image you want to project to shooters and the community bring in new customers and repeat business.

How Much Acoustic Treatment Do You Need?

You can never have too much sound absorption. To fully absorb the sound of gunfire it is imperative that at least 75% of all exposed surfaces be acoustically treated. This is because if you allow reverberation to build up in any area of the range it will increase the overall sound pressure on the entire range. Please keep in mind that the louder the noise is on the range ... the louder the noise that will be heard outside of the range.

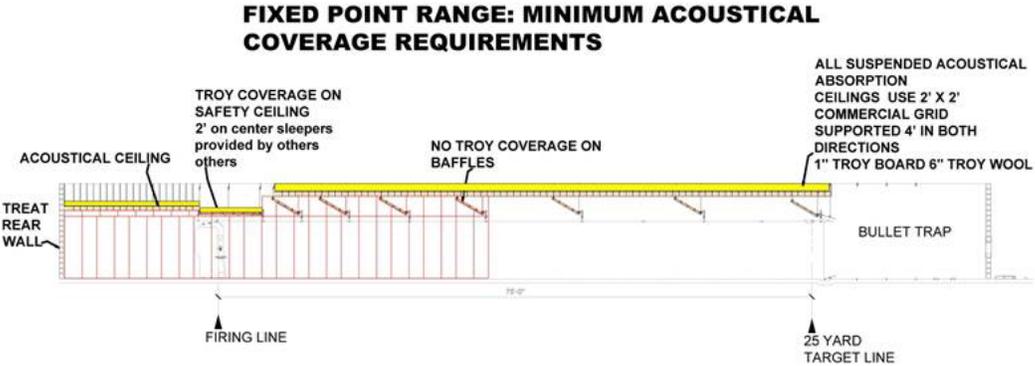
Indoor Fixed Point Shooting Range

Typically an **Indoor Fixed Point Range** will have few baffles which are spaced widely apart. Because of that, an isolation ceiling is recommended from the rear wall behind the shooter to the safety ceiling and from the front of the safety ceiling down to the target line/trap. If there are shooting stalls, they can create their own set of problems as they tend to enclose the shooter. It is possible to design shooting stalls with excellent acoustic and ballistic properties.

Drawing 1 below shows the recommended full acoustical treatment utilizing the patented Troy System™ for a typical fixed point, indoor shooting range.

**The world's highest acoustical rating.
The industry's only guaranteed solution.**

Troy Acoustics recommends that an indoor fixed point range for maximum performance be treated as follows in **Drawing 1**:



TREAT A MINIMUM 50-75% OF SIDE WALLS FROM REAR WALL TO TARGET LINE ON FIXED POINT SINGLE FIRING LINE

- **Rear Wall** should have attached wood or metal 1-1/2" sleepers mounted 24" on center (sleepers not included). The rear wall is treated, floor to under the air handling system, with 2" Troy Wool™ covered with 2" Troy Board™. If sound isolation is needed behind the rear wall it is recommended that before applying acoustic material, the wall be covered with one layer of a gypsum board material (drywall) nominal dimension 5/8" thick (not included). This must be installed directly onto the concrete CMU block or AR Steel with NO air space. If more isolation is needed order 2" Troy Board™ with 6" Troy Wool™ (frame rear wall accordingly) along with the drywall.
- **Safety Ceiling** should have attached wood or metal 1-1/2" sleepers mounted 24" on center (sleepers not included). 2" Troy Wool™ is placed between the sleepers (we recommend it be held in place with spray adhesive) than covered with 1" Troy Board™. No plywood is needed
- **Rear Suspended Ceiling** consists of a 2'x2' (recommended) heavy duty grid system with supporting straps installed 4' in each direction (not supplied). The acoustic ceiling is hung from the rear of the safety ceiling to the rear wall, just above the air handling system. 1" Troy Board™ is placed in the grid and covered with 6" of Troy Wool™
- **Forward Suspended Ceiling** consists of a 2'x2' heavy duty grid system with supporting straps installed 4' in each direction (not supplied). The acoustic ceiling is hung from the front of



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the safety ceiling to the target line. 1" Troy Board™ is placed in the grid and covered with 6" of Troy Wool™

- **Side Walls** should have attached wood or metal 1-1/2" sleepers mounted 24" on center (sleepers not included), from the rear wall to at least half way down from the firing line to the target line. The side walls are treated, from 6" above the floor to the bottom of the hung Troy acoustic ceiling, with 2" Troy Wool™ covered with 2" Troy Board™. If sound isolation is needed behind the rear wall it is recommended that before applying acoustic material the wall be covered with one layer of a gypsum board material (drywall) nominal dimension 5/8" thick (not included). This must be installed directly onto the concrete CMU block or AR Steel with NO air space. If more isolation is needed order 2" Troy Board with 6" Troy Wool (frame side wall(s) accordingly) along with the drywall.
- **Baffles** are not typically acoustically treated on a fixed point range as the sound absorption and noise abatement is provided by the forward suspended acoustic ceiling. If you wish to acoustically treat the baffles we recommend that they have attached wood or metal 1-1/2" sleepers mounted 24" on center (sleepers not included). 2" Troy Wool™ is placed between the sleepers (we recommend it be held in place with spray adhesive) than covered with 1" Troy Board™. No plywood is needed when a baffle is treated with the Troy System™. It is not recommended to acoustically treat the baffle nearest to the bullet trap as typically it is the recipient of the most missed-fired rounds.
- **Shooting Stalls** – in our experience most ranges use pre-manufactured shooting stalls. If you are building your own stalls please contact Troy Acoustics for more information.

The coverage described above will give you maximum sound absorption and noise abatement. Considering your specific needs it might be possible to use less coverage and still achieve desired results. It might also be possible, depending on your situation and budget, to begin with partial coverage of you range to be completed at a later date. To learn more contact your Troy representative.

The Troy System™ was specifically formulated for the intense sound pressure generated by small arms fire, absorbing a minimum of 95% of all muzzle blast energy, at all frequencies. The materials used have the highest sound absorption in the industry and are noncombustible, fire resistant and are rated for anti-ricochet and anti-splash back by the US Air Force. There is no need for plywood in areas of your range treated with the Troy System™.

Below is a worksheet for your convenience to determine the total square footage of the Troy System™ needed to treat your range. The price for all areas of coverage is \$7.75 a square foot. The \$ 7.75 per sq. ft. pricing excludes sales tax (if applicable) & shipping. All materials are FOB Brunswick GA and are available for pickup at our warehouse.

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Troy Board sizes are 2' wide x 8'6" long. Troy Wool™ is provided in square feet comparable to the square footage of the Troy Board™ ordered. Troy Wool™ may be shipped as one layer of 6" or three layers of 2" where 6" is called for. We suggest that you add a waste factor to all dimensions, 5% is typical; review this with your drywall or general contractor. Fasteners are supplied where applicable at 10-fastners per 8'6" Troy Board. Fasteners are not supplied for any suspended acoustical ceilings. Please specify if you need fasteners for wood or metal furring strips. Generic shop and detail drawings are provided.

This paper only suggests acoustic materials and their application and does not constitute any guaranteed or warrantied results. Performance guarantees, design services, including site specific design, shop drawings, pre and post testing, reports, zoning and/or planning commission meetings, etc. are available as fee based services. Please contact Troy Acoustics for more information.

The Customer understands that they are responsible for the procurement of furring strips, sleepers, z-channel, j-channel, spray adhesive, gypsum board, paint, etc. Troy offers for sale, pre-punched z-channel, j-channel, edge metal and extra fasteners specifically fabricated for the Troy System™.

Although not required, it is recommended that the Troy System is painted with 3 coats of acrylic latex paint with an airless sprayer. Troy Board™ can be saw-cut to fit using common tools. Troy Wool™ can be cut with a serrated knife. Installation of the Troy System is basic and can be done by most persons with basic contracting skills. Caution and good practices should be used as with all construction materials. Material handling data sheets for the Troy System™ are provided.

Please use the worksheet below to calculate your square footage requirements to treat your range with the Troy System™. An Excel version of the worksheet is available at the Troy Acoustics website www.troyacoustics.com/commercialrangeworksheet. An order form can be downloaded at www.troyacoustics.com/commercialrangeorderform.

Areas of Coverage	Quantity	Width	Height	Depth	Sq Feet	% Waste	TTL Sq Feet
Rear Wall 2" Troy Board/2" Troy Wool				-			
Rear Wall 2" Troy Board/6" Troy Wool				-			
Side Wall 2" Troy Board/2" Troy Wool				-			
Side Wall 2" Troy Board/6" Troy Wool				-			
Safety Ceiling	-		-				
Isolation Ceiling (from safety ceiling to rear wall)			-				
Isolation Ceiling (from safety ceiling to target line)			-				

For more information call Joan Terry Drucker (x400) or Lou Salseda at 800-987-3306 or Email us at: info@troyacoustics.com

Go Safe. Go Healthy. Go Quiet. Go Troy

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