

Troyer Field Target Rating System

Air Rifle Troyer Rating

Brad Troyer is one of the early field target shooters in America. He has served on the AAFTA Board of Governors, owns the American Airgun web site, and has been a Match Director. As an early Match Director he was having some difficulty in gauging the difficulty of the courses of fire he was setting up. The courses of fire were either easier or much more difficult than he intended. Brad Troyer developed and defined a field target difficulty rating system in 1996 to help gauge the difficulty of the course of fire for his matches. This helped him avoid setting up courses of fire that were too easy or too difficult, but allowed for different ranges of difficult and easy targets within the course of fire.

Brad Troyer's rating system gained immediate acceptance across the field target community. It was dubbed the Troyer Rating from the beginning and has developed into a comprehensive method of determining the difficulty level of individual targets, as well as entire courses of fire. The Troyer Rating determines the level of difficulty by dividing the distance to the target, in yards, by the size of the target kill zone, in inches, and adjusts with a difficulty factor for the shooting position (kneeling/standing), wind conditions, extreme lighting conditions, extremely long shots, and extreme vertical angles for the shot. For example, a ½" kill zone Squirrel placed at 21 yards would have a unadjusted Troyer difficulty rating of 42 while a 1" Skunk at 32 yards would have a Troyer Rating of 32.

$$\text{Troyer Rating} = [\text{Distance (yards)} / \text{Kill Zone Size (inches)}] \times \text{Difficulty Factor}$$

In 2005 the American Airgun Field Target Association (AAFTA) published the Troyer Rating system on its web site and it has become the standard across America. Today it is used in almost every field target club around the world for evaluating target difficulty and as a basis for comparing different competitions.

The basic, unadjusted Troyer numeric rating for rifles ranges from 10 (1" @ 10 yds), or very easy, to 100 (1/2" @ 50 yards), or nearly impossible. The range of unadjusted Troyer Ratings for any given target in a match usually falls between 15 and 40 giving a healthy spread of 25 for most matches.

Scores are then adjusted to account for factors that may impact the individual target difficulty.

Type of Rifle Shot	Difficulty Factor
Standing	1.75
Kneeling	1.5
Windy	1.25
Extreme Up or Down	1.25
Extreme Light or Dark	1.25
Shots Past 45 Yards	1.125

The Air Rifle Troyer Ratings are classified in the tables below.

Individual Rifle Target Difficulty Ratings	
Classification	Rating
Easy	0 to <20
Moderate	20 to <30
Hard	30 to <40
Expert	40 and up

Overall Rifle Course Difficulty Ratings	
Classification	Rating
Easy	0 to <25
Moderate	25 to <30
Hard	30 to <36
Expert	36 and up

Troyer Pistol Field Target Rating System

As Pistol Field Target (PFT) competitions are starting to gain popularity across America, a Troyer PFT Rating has been refined for the sport. The Troyer Ratings are slightly different for PFT competitions. Since PFT targets are set much closer than rifle field targets, and the kill zones are much larger, the Troyer Ratings are much lower than those found in the rifle field target sport. There is a basic linear relationship between pistol and rifle Troyer Ratings covered at the end of this article. Several efforts were made to modify the Troyer PFT Rating values to get them to match the rifle Troyer Rating values, but all were too complex to be practicable. In the end, the Troyer Pistol Rating is what it is, different. A table is included at the end of this article that crosswalks the Troyer PFT Ratings to an equivalent rifle Troyer Rating for comparison purposes.

When applied to Pistol Field Target competitions the unadjusted Troyer PFT Rating ranges from 9.5 to 17, giving only about a 7.5 point spread. The Troyer equation remains unchanged for PFT:

$$\text{Troyer PFT Rating} = [\text{Distance (Yards)} / \text{Kill Zone Size (inches)}] \times \text{Difficulty Factor}$$

Unadjusted Troyer Pistol Factors for Each Target

		Target Distance in Yards																	
		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
KZ Size	0.75	10.7	12.0	13.3	14.7	16.0	17.3	18.7	20.0	21.3	22.7	24.0	25.3	26.7	28.0	29.3	30.7	32.0	33.3
	1	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0
	1.25	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0
	1.5	5.3	6.0	6.7	7.3	8.0	8.7	9.3	10.0	10.7	11.3	12.0	12.7	13.3	14.0	14.7	15.3	16.0	16.7
	1.75	4.6	5.1	5.7	6.3	6.9	7.4	8.0	8.6	9.1	9.7	10.3	10.9	11.4	12.0	12.6	13.1	13.7	14.3
	2	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
Yards		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Easy	0 to <12
Moderate	12 to <14
Hard	14 to <16
Expert	16 and up

The Difficulty Factors remain nearly unchanged from the standard rifle Troyer Ratings. The Troyer PFT Rating difficulty factors are shown in the table below.

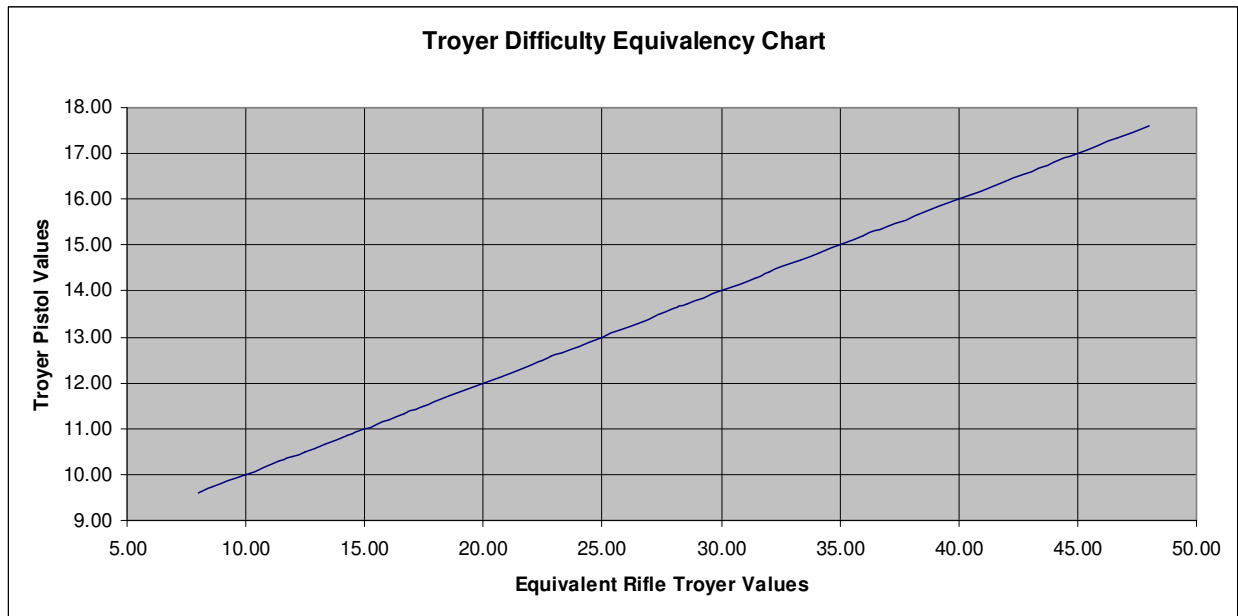
Type of Pistol Shot	Difficulty Factor
Standing	1.75
Kneeling	1.5
Windy	1.25
Extreme Up or Down	1.25
Extreme Light or Dark	1.25
Shots Past 20 Yards	1.125

The Troyer PFT Ratings are classified in the tables below.

Individual Pistol Field Target Difficulty Ratings	
Classification	Rating
Easy	0 to <12
Moderate	12 to <14
Hard	14 to <16
Expert	16 and up

Overall Pistol Field Target Course Difficulty Ratings	
Classification	Rating
Easy	0 to <13
Moderate	13 to <14
Hard	14 to <15
Expert	15 and up

Two charts were developed to set apart the factors involved when figuring the target difficulty and the overall course difficulty. A single target rating of 15 is considered Hard, but if you string a whole bunch of them together on a course then the fatigue and concentration factors come into play during the match, which puts the course on the Expert level. The two separate charts account for these differences.



The equation that relates the unadjusted Troyer Pistol Factor to the unadjusted Equivalent Rifle Troyer Factor is:

$$\text{[(Troyer PFT Rating} - 9.5) \times 5] + 7.5 = \text{Equivalent Rifle Troyer Factor}$$

Conversely:

$$\text{[(Troyer Rifle Rating} - 7.5) \div 5] + 9.5 = \text{Equivalent Troyer PFT Factor}$$

The equations and chart above will convert either unadjusted Troyer Factors or Troyer Factors adjusted for Difficulty Factors (standing, kneeling, wind, elevation, lighting, and long shots) as both the same linear relationship. The Troyer Equivalency Table on the following page is limited to unadjusted Troyer factors to limit the size of the table. If the table were built to account for the adjusted factors it would be monstrously long as there are multiple adjusted factors for each unadjusted factor. This would multiply the length of the equivalency table, so it is limited to unadjusted Troyer Factors.

The Troyer Difficulty Equivalency Table has all of the Troyer Pistol Factors possible from the unadjusted Troyer Pistol Factors Table, but does not have all of the possible Rifle Troyer Factors. The Troyer PFT Ratings are shown here to 2 decimal places where the Troyer Pistol Factors Table only shows them rounded to 1 decimal place.

Many Thanx to Brad Troyer for taking the time and having the patience to sit with me and explain why the rating system has to work the way it does. His faith shines unshakable and his brilliance unsurpassed.

The End

Bobby Roberts
08 October, 2008

Troyer Pistol Rating	9.60	8.00	Equivalent Rifle Troyer Rating
	9.71	8.57	
	10.00	10.00	
	10.29	11.43	
	10.40	12.00	
	10.50	12.50	
	10.67	13.33	
	10.86	14.29	
	11.00	15.00	
	11.20	16.00	
	11.33	16.67	
	11.43	17.14	
	11.50	17.50	
	12.00	20.00	
	12.50	22.50	
	12.57	22.86	
	12.67	23.33	
	12.80	24.00	
	13.00	25.00	
	13.14	25.71	
13.33	26.67		
13.60	28.00		
13.71	28.57		
14.00	30.00		
14.29	31.43		
14.40	32.00		
14.67	33.33		
15.00	35.00		
15.20	36.00		
15.33	36.67		
16.00	40.00		
16.67	43.33		
16.80	44.00		
17.00	45.00		
17.33	46.67		
17.60	48.00		
Troyer Difficulty Equivalency Table			