



# 2023 WFTDA Rankings Algorithm

## Overview

- Rankings are regional - the calculations are done separately for each region and if a game counts for multiple regions (i.e., a geographic region and the GUR) a team will have their ranking points and rankings calculated separately for each region.
  - Only games between teams in the same region count for regional rankings.
  - Ranking points and rankings should not be compared from one region to another.
- Rankings are seasonal - only games played within a rankings season count towards a team's ranking for that season.
  - The first rankings season of this system starts on January 1st 2023, after that a new rankings season starts on July 1st of every even numbered year (2024, 2026, ...). Rankings seasons do not overlap.
  - If a team has not played yet in a season, their final ranking from the previous season will be used to initially estimate their strength.
- Teams that newly enter a region will have to play a seeding game against an already ranked team as their first game in the region.
- Ranking points are set up so that if Team A has double the ranking points of Team B, they are predicted to win a game between the teams with double the score.
- In order to be eligible for Regional Championships, a team will have to play at least 5 games against teams that are reasonably close to them, where closeness is defined by either distance in rankings spots or in rankings points, whichever leaves more valid opponents. In addition, any game that is close on the track will count, even if it was not predicted to be.

## Fair Play Principle

The rankings system described in this document is based on an assumption of faithful and honest gameplay, in which both teams are trying to get the best result possible, and the only intentional determinator of rank is the strength of the teams. Deliberate attempts to alter rankings directly in a way that does not reflect the true strength of the teams is considered deceptive and could be a violation of the WFTDA Code of Conduct.

This not only includes a team attempting to boost their strength through unsporting means (such as rostering “guest skaters” to get into Regional Championships, who will not be skating with the team during Regional Championships), but also attempts to lower their own ranking, or boost an opponent’s, by intentionally holding back<sup>1</sup>. It can also include attempts to get or maintain an inaccurate ranking by being overly picky with which games a team is willing to sanction.

## Terminology

This document uses a number of similar terms to refer to several related but distinct concepts. In order to minimize confusion, usage of these terms is defined here.

- **Game Score:** The official final score of a game.
- **Ranking Points:** A points value calculated by the ranking algorithm. We distinguish two types of these:
  - **Game Ranking Points:** The Ranking Points a team is credited with for an individual game.
  - **Average Ranking Points:** The Ranking Points calculated for a team based on all games they played in a season.
- **Ranking:** An ordered list of teams and their Average Ranking Points.
- **Rank:** The position a team has within a given Ranking.
- **Current Average Ranking Points/Rank:** The Average Ranking Points/Rank a team has in the most recent official Ranking for that region.
- **Sanctioned Game:** A game registered for sanctioning where both teams are ranked, in the region in question, at the time of the game.
- **Seeding Game:** A game registered for sanctioning where at the time of the game one team is registered but unranked, in the region in question, and the other team is ranked in that region.

## Calculating Rankings

All of the following calculations are done separately for each region and references to current rankings and game types are to be understood to refer to the region the calculation is done for.

## Ranking Teams

Teams are ranked by their Average Ranking Points, in descending order.

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<sup>1</sup> Easing off in a (non-seeding) game that has gone beyond a 4:1 score ratio does not affect rankings and is thus never considered a violation of this principle. Easing off because skaters are tired or at risk of injury is not an attempt to lower a team’s ranking and thus is not considered a violation of this principle.

The WFTDA will produce and publish an official ranking for each region based on the games played up until the end of each calendar month. Current Average Ranking Points and Current Rank are based on the latest of these published rankings.

The WFTDA may produce additional rankings, e.g. a live ranking that includes games played since the last official ranking. These rankings, if produced, are only for information purposes and do not affect any calculations.

## Calculating Average Ranking Points

- If a team has played at least one eligible<sup>2</sup> game in the current rankings season, their Average Ranking Points are calculated as the [weighted geometric mean](#)<sup>3</sup> of the Game ranking points, averaged over all eligible games.
  - Games played in the first 6 months of the rankings season are given a weight of 0.5.
  - Games played from the 7th month of the rankings season onwards are given a weight of 1.
- For the 2023/24 rankings season only, if a team has not played any eligible games yet but has a 2023 initial seeding, their Average Ranking Points are equal to their seeding.
- After 2023-2024, if a team has not played any eligible games in the current rankings season yet but has played eligible games in the previous rankings season, their Average Ranking Points are equal to the Average Ranking Points from the previous season's final ranking.
- Teams that signed up for a region but do not satisfy any of these conditions are unranked.

### Example:

Team A has played games with 900 and 625 Game Ranking Points (see below for how "Game Ranking Points" are calculated) respectively in the first 6 months of the season and games with 781.25 and 720 Game Ranking Points later on.

They will have  $\sqrt[3]{900^{0.5} * 625^{0.5} * 781.25 * 720} = 750$  Average Ranking Points.

If they play another game and earn 800 Game Ranking Points, that will bring

them to  $\sqrt[4]{900^{0.5} * 625^{0.5} * 781.25 * 720 * 800} = 762.20$  Average Ranking Points.

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<sup>2</sup> Sanctioned games are eligible for both teams, seeding games are eligible for the newly seeded team only.

<sup>3</sup> In spreadsheet programs, if the Game Ranking Points are in cells A1:A10 and the weights are in cells B1:B10, this can be calculated with the formula =EXP(SUMPRODUCT(B1:B10, LN(A1:A10))/SUM(B1:B10))

## Calculating Game Ranking Points

Game Ranking Points are calculated based on the relationship between the predicted score ratio and the actual score ratio. The predicted score ratio is based on the ratio of both teams' Current Average Ranking Points.

The basic prediction formula used is

$$\frac{\text{own Current Average Ranking Points}}{\text{opponent Current Average Ranking Points}} = \frac{\text{own Game Score}}{\text{opponent Game Score}}$$

For calculating Game Ranking Points we distinguish Sanctioned Games, where both teams have a ranking going into the game, and Seeding Games, where one of the teams is unranked (see below).

A game between two unranked teams does not count for ranking or seeding.

### Sanctioned Games

For sanctioned games the basic formula is modified such that any predicted or actual score ratio that exceeds 4:1 is capped at that value. This is intended to avoid teams having to squeeze every point out of a blowout game. Thus we define

$$\text{predicted score ratio} = \frac{\text{own Current Average Ranking Points}}{\text{opponent Current Average Ranking Points}}$$

$$\text{actual score ratio} = \frac{\text{own Game Score}}{\text{opponent Game Score}}$$

*capped predicted score ratio* = *predicted score ratio*, but not more than 4 and not less than 0.25.

*capped actual score ratio* = *actual score ratio*, but not more than 4 and not less than 0.25. Finally

$$\text{Game Ranking Points} = \text{own Average Ranking Points} * \frac{\text{capped actual score ratio}}{\text{capped predicted score ratio}}$$

#### Example 1:

Team A has 750 Current Average Ranking Points and plays Team B that has 500 Current Average Ranking Points. The game ends with A winning 160-100.

From Team A's point of view the predicted score ratio is  $\frac{750}{500} = 1.5$  which is not capped. The actual score ratio is  $\frac{160}{100} = 1.6$  which is also not capped.

Thus A gets  $750 * \frac{1.6}{1.5} = 800$  Game Ranking Points for this game.

From Team B's point of view the predicted score ratio is  $\frac{500}{750} = 0.67$  which is not capped. The actual score ratio is  $\frac{100}{160} = 0.625$  which is also not capped.

Thus B gets  $500 * \frac{0.625}{0.67} = 468.75$  Game Ranking Points for this game.

**Example 2:**

Team A has 1000 Current Average Ranking Points and plays Team B that has 100 Current Average Ranking Points. The game ends with A winning 250-50 after giving lots of track time to reserve skaters.

From Team A's point of view the predicted score ratio is  $\frac{1000}{100} = 10$  which is capped at 4. The actual score ratio is  $\frac{250}{50} = 5$  which is also capped at 4.

Thus A gets  $1000 * \frac{4}{4} = 1000$  Game Ranking Points.

From Team B's point of view the predicted score ratio is  $\frac{100}{1000} = 0.1$  which is below 0.25. The actual score ratio is  $\frac{50}{250} = 0.2$  which is also below 0.25. So both are set to 0.25.

Thus B gets  $100 * \frac{0.25}{0.25} = 100$  Game Ranking Points.

## Seeding Games

In a seeding game we only calculate Game Ranking Points for the previously unranked team. We also do not apply a cutoff in order to achieve greater accuracy. This gives an easier formula:

*Game Ranking Points = opponent Current Average Ranking Points \* actual score ratio*

If the actual score ratio of a seeding game is 10:1 or greater, that game does not count as a seeding game because games with extreme score ratios don't give enough information to derive a reasonably accurate ranking.

If a previously unranked team plays a seeding game, the resulting Game Ranking Points go into effect as their Current Average Ranking Points immediately, allowing them to play regional sanctioned games in the same month (or day!). Their opponent's Average Ranking Points are not affected by seeding games, and that opponent also does not get any Game Ranking Points.

If a team is unable to find an opponent for a seeding game that would result in a game score ratio of less than 10, they should reach out to [games@wftda.com](mailto:games@wftda.com), provide documentation of their efforts, and explain the situation. Competitive Play may be able to assign a seed using a different method.

# Rankings and Championship Eligibility

- Only Teams entered for a region by a WFTDA Member league are eligible to be included in WFTDA rankings.
- A team can be entered in at most one geographically defined region at a time, and optionally the Geographically Unrestricted Region (GUR) as well.
- If a team switches from their original region to a new region, they start out as an unranked team with a game count of zero.
  - a. A team's "original region" is the region in which they played their last game during the prior season. For a team that did not exist in the prior season, their original region is the region in which they played their first sanctioned game in the current season.
  - b. If a team later switches back to their original region, they will pick up where they left off. Games played in the other region will not count towards their rank or towards their game count.
  - c. A team may only switch to a new region once per rankings season and switch back to the original region once. After that, no more region changes are allowed in that season.
- If, after playing a game, one of the teams leaves the region, the game is still counted for the team that remains.
- Any team that has any Ranking Points as per [Calculating Average Ranking Points](#) above is included in the published rankings for a region.
- In order to be eligible for Regional Championships, a team has to have played at least 5 close games in the current season in the region. This includes Seeding Games for the newly seeded team (but not for the already ranked team). A game is considered "close" if it has ANY of the following qualities:
  - a. The actual score ratio of the game is between<sup>4</sup> 0.25 and 4, or
  - b. The predicted score ratio of the game, at the time of the game, is between<sup>5</sup> 0.25 and 4, or
  - c. The predicted score ratio of the game, at the time of the sanctioning application, is between<sup>5</sup> 0.25 and 4, or
  - d. The difference of the teams' ranks, at the time of the sanctioning application, is less than<sup>5</sup> 15.

For the 2023-2024 season, the WFTDA will be monitoring these requirements and may choose to remove or relax certain restrictions overall or selectively, if the ecosystem or a small number of teams face unexpected circumstances.

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<sup>4</sup> A ratio of exactly 0.25 or 4 is considered "close."

<sup>5</sup> A difference of exactly 15 ranks (e.g. #1 and #16) is NOT considered "close."