



MEMORANDUM

August 16, 2023

VIA EMAIL

TO: NCAA Divisions I, II and III Wrestling Head Coaches.

FROM: Chuck Barbee, outgoing weight management liaison and secretary-rules editor  
NCAA Wrestling Rules Committee.

Jimmy Chung, incoming weight management liaison and secretary-rules editor  
NCAA Wrestling Rules Committee.

SUBJECT: 2023-24 NCAA Wrestling Weight Management Packet.

Enclosed in this correspondence is the NCAA Wrestling Weight Management Program information for the 2023-24 season, which includes 10 supplements.

As the head coach, you are responsible for communicating to your wrestlers, medical personnel and other individuals associated with your team, the importance of the weight certification process. The health and safety of each wrestler is the primary concern. It is also prudent to talk about the prohibited weight loss practices found in Rule 9.5 of the NCAA rules book and remind wrestlers that the penalties for violating the weight management and/or prohibited practices rules are severe. Coaches and medical personnel have an obligation to report unsafe and/or illegal weight loss practices or weight management violations. In the event you discover a possible violation, please contact the NCAA Wrestling Rules Committee liaison at the NCAA national office at 317-917-6222.

The primary purpose of the weight certification program is to assist wrestlers in determining the weight class that is best for them, based on their current body composition. The certification process will also result in wrestlers receiving a weight loss descent plan. You should encourage all wrestlers losing weight, in both preseason and during the season, to utilize the descent plan. This document will assist them by providing clear guidance on what they should be weighing each week to descend safely to the lower weight classification.

**Mandatory viewing of the NCAA wrestling presentation and registration:** It is mandatory that the assessor and head coach from each institution view the NCAA Wrestling Weight Management Presentation. This presentation will be available in the Trackwrestling messaging system today, August 16. Medical personnel are only required to view the weight management presentation and will not have to view the rules presentation which will be available later in September. Head coaches are required to view both presentations.

**Trackwrestling Optimal Performance Calculator (OPC) login:** Each institution's assessor login ID and password for the OPC is emailed from the National Wrestling Coaches Association (NWCA) office to the head athletic trainer and emailed to the assessor on record from the 2022-23 season.

Please note that each institution's coach's login ID and password for the OPC is emailed from the NWCA office to the head coach.

**Trackwrestling system and OPC setup requirements:** Before midnight October 1, the following responsibilities shall be performed in the OPC system:

1. View the annual "NCAA Wrestling Rules Presentation and Weight Management Presentation;"
2. Input the team's first day of practice into the Trackwrestling system;
3. Input the team's complete competition schedule into the Trackwrestling system; and
4. Input the team's complete roster into the Trackwrestling system (NOTE: A wrestler may not be put on the Trackwrestling roster and certified until listed on the official institutional team roster).

**Carefully approving weight certifications:** Reminder, once a wrestler's weight certification is approved by both the medical assessor and the coach, the results are final and unalterable. The Wrestling Rules Committee will not consider reviews.

**Weight class ascent/descent option:** There are no changes to the rules related to weight loss descent. In all cases, if a wrestler competes up a weight class, they are required to follow the weight loss descent plan to determine the date in which they are again eligible for the lower weight. This provision of moving up a weight class and dropping back down may be applied multiple times during the season, up to the first day of postseason competition weigh-in deadline.\*\*

\*\*Wrestlers whose weight loss descent plan does not indicate they may weigh-in at 125.0, 133.0, 141.0, 149.0, 157.0, 165.0, 174.0, 184.0, 197.0, 285.0 or lower on the first day of postseason competition are not eligible to weigh-in for the postseason event at the lower weight classification.

**Educational materials:** Several excellent resources beneficial to medical personnel and student-athletes are available online at [www.ncaa.org/sport-science-institute](http://www.ncaa.org/sport-science-institute).

**Questions:** During the weight certification period, if you have questions, comments or suggestions regarding the NCAA Weight Management Program or weigh-in rules, you should contact Jimmy Chung, incoming NCAA wrestling weight management liaison and secretary-rules editor, at [ncaawrestling.sre@gmail.com](mailto:ncaawrestling.sre@gmail.com). Questions regarding urine collection, specific gravity testing, body composition measurements and calculations should be directed to Jim Thornton, NCAA athletic trainer liaison, at 814-393-2456. If you have technical questions regarding the use of the Trackwrestling OPC, please contact Trackwrestling [here](#) or call 715-869-3444.

Have a great season!

CB/JC:af

Enclosures

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August 16, 2023

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cc: Marc Burchard  
Carlyle Carter  
Eve Duncan  
Dave Kemmy  
Rod Lovett  
Mike McCormick  
Jackie Paquette  
Jim Thornton  
Justin Tritz  
NCAA Certified Athletic Trainers  
NCAA Wrestling Rules Committee  
Selected NCAA Staff Members



## Accessing Rules 8 and 9 in the NCAA Wrestling Rules Book

You can download the 2023-24 and 2024-25 NCAA Wrestling Rules Book by following the steps below:

1. Go to [www.ncaapublications.com](http://www.ncaapublications.com).
2. Click on Rules Books.
3. Click on Wrestling.
4. Click on 2023-24 and 2022-23 Wrestling Rules Book.
5. Choose one of the three options to download to your computer or mobile device.

Weigh-in, medical examinations and weight assessment rules are located in Rules 8 and 9.



## NCAA Weight Management Program Overview

The goal of the NCAA Weight Management Program is to assist wrestlers in the selection of a healthy and appropriate weight classification and prevent unhealthy weight management practices through education and best practices.

It is important that coaches and wrestlers practice and monitor the best practices established for proper weight management. If the goal is weight loss, then wrestlers should be informed that removing body fat is a slow process and should be supported with a health care team to help accomplish the goal in a safe and supervised manner. The wrestler and appropriate medical personnel, including members of the institution's athletic medical staff, registered dietitians, and with consultation from the coach, should agree upon weight loss goals.

Without this leadership support, negative behaviors may occur that can limit athletic potential and create potential health hazards that occur with poor nutrition, dehydration, and intense exercise. A student-athlete's exercise performance, heat dissipation and cardiovascular function are compromised when water loss exceeds 2-3 percent of the body weight. Since water is found less in fat stores and more in the blood stream, muscle and other lean organs of the body, proper hydration is critical for body function and performance. Rapid weight loss/gain by a student-athlete can be an indicator that the individual is ill or is severely restricting/dehydrating or binge eating.

The original established principles of the NCAA Weight Management Program outline sensible alternatives to dehydration weight loss.

- Enhance safety and competitive equity;
- Minimize incentives for rapid weight loss;
- Emphasize competition, not weight control; and
- Implement practical, effective, and enforceable guidelines.
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The NCAA Weight Management Program goals (established in 1998) guide the weight management process and the development of associated playing rules.

- Establish weight classes that better reflect the collegiate wrestling population;
- Establish a permanent healthy weight class early in the season with time to achieve it safely;
- Establish weigh-ins as close to the start of the match as possible, and use a random draw for weight class order; and
- Eliminate the tools used to accomplish rapid dehydration.

Coaches have a tremendous influence on athletes and should be conscious of this verbal and non-verbal language might contribute to the onset of unhealthy eating behaviors and/or lifestyles. Behavior modifications may need to be supported and taught among wrestlers to retrain the body to establish a normal state of hydration. In addition to observing sweat loss, fluid intake and body

weight, observing urine color is a good indicator of an athlete's hydration state and can be useful in teaching athletes how to stay well hydrated.

For further information, please consult with your team physician, head athletic trainer or a local dietician with experience in working with athletes. The American Dietetic Association ([ADA – Sports Cardiovascular and Wellness Nutrition](#)) sports dietician practice group is a useful resource to find individuals with expertise working with student-athletes. This site also includes fact sheets for coaches and student-athletes regarding nutritional strategies. In addition, the NCAA Sports Medicine Handbook has Guidelines on Nutrition and Athletic Performance, as well as information on Weight Loss – Dehydration. The NCAA Sports Medicine Handbook is available at <http://www.ncaa.org/sport-science-institute>.

The National Wrestling Coaches Association has two additional resources specific to the wrestling and the 1.5 percent weight loss decent rules:

- [The 1.5 percent-Per-Week Rule Part 1: Fat Loss](#)
- [The 1.5 percent-Per-Week Rule Part 2: Water Loss](#)

Wrestlers should be educated about the negative effects of active dehydration techniques. In addition to the normal water loss due to exercise, wrestlers often have difficulty rehydrating properly. Wrestlers with a body weight loss of 1–2 percent within a given day or on consecutive days should return to normal hydration status before returning to practice.

Research clearly shows performance is reduced because of dehydration-induced weight loss. Coaches and participants should avoid rapid weight cutting, weekly weight cycling, restricting food, restricting fluids, vomiting, fasting, and the use of laxatives, diet pills, or diuretics. Wrestlers should be warned about the use of dietary supplements and should discuss all supplement use with their athletics healthcare staff.

Activities banned by the NCAA during the playing rules competition season (first day of class to end of competition season) include the use of saunas, vapor-impermeable suits (for example, rubber, rubberized nylon, neoprene, or plastic), stimulants, diuretics (for example, water pills) and over-heated wrestling facilities. Check with the NCAA Wrestling Rules book, NCAA legislation, and the NCAA Sports Medicine Handbook for more information.



## NCAA Weight Management Program Calculating Lowest Allowable Weights

This document outlines instructions for completing Section I Certification of the NCAA Weight Management Program and examples for reference. The lowest allowable weights are calculated using the Trackwrestling Optimal Performance Calculator (OPC).

### INITIAL CERTIFICATION TO DETERMINE MINIMUM WRESTLING WEIGHT

Institutions are required to enter the wrestler's minimum wrestling weight certification forms (Section I) online at <http://www.trackwrestling.com> on or before Nov. 1. Wrestlers joining the team after Nov. 1 shall complete a Section I weight certification on the wrestler before they compete. Note: regardless of when the weight certification is completed, the wrestler shall strictly adhere to the allowable minimum wrestling weight listed in the weight loss descent plan.

#### LOWEST ALLOWABLE WEIGHT-ONE [LAW1]

The lowest allowable weight at five percent body fat.

(This is the most common calculation for preseason certifications.)

**Step No. 1. Determine Hydrated Weight (BW).** To obtain an accurate body composition, the student-athlete must be in a hydrated state. Urine specific gravity has been selected as the most practical, cost-efficient measure of hydration.

- Record date of test and have wrestler provide a **WITNESSED** urine sample.
- A member of the institution's athletics medical staff, of the same gender (for example, physician, certified athletic trainer, or registered dietician) shall be required to visually witness the student-athlete produce a urine sample. The student-athlete must deliver the sample directly to the witness who ensures its delivery to the medical professional whose responsibility it is to determine body hydration.
- Check urine sample for specific gravity using refractometer (gold standard) or urinometer to provide a valid specific gravity value. *Note: Test strips are not permissible as a measuring device for specific gravity.*
- If specific gravity is greater than 1.020, the wrestler must return not earlier than 24 hours in a hydrated state for a retest.
- If the specific gravity is less than or equal to 1.020, the wrestler's initial hydrated body weight is recorded to the nearest tenth of a pound (no rounding).

**Step No. 2. Calculate Body Density (BD).** Body density may be calculated by either (a) skin-fold measurement with calipers approved by medical personnel; (b) underwater weighing with a direct measure of residual volume; or (c) bod pod analysis.

#### ***Option A: Skinfolds.***

- Skin-fold measurements - see enclosed directions.
- Measure in serial order, (for example, triceps, subscapular, abdomen, repeat series two more times).

- Add median values for triceps, subscapular and abdominal skinfolds to get the sum of skinfolds (SUM SF).
- Median skin-fold measurement is:
  - a. The middle (quantity, not space) value, if there are three distinct values (for example, 13mm, 11mm, 12mm. Median = 12mm); and
  - b. The duplicate value, if two or all three measurements are identical (for example, 12 mm, 12 mm, 15 mm. Median = 12 mm).
- SUM SF is inserted into appropriate body density equation and BD calculated.

***Option B: Hydrostatic Weighing.***

- Calculate a value for body density using standard underwater weighing technique with a direct measure of residual volume.
- Provide the following as an attachment to any form:
  - a. Residual Volume (RV) measurement technique;
  - b. Raw data and calculations associated with RV;
  - c. Raw data for underwater weighing; and
  - d. Calculations of body density.

***Option C: Bod Pod Analysis.***

- See enclosed bod pod analysis protocol.

**Step No. 3. Optimal Performance Calculator (OPC).** The OPC will use the appropriate equation to automatically calculate the percentage of body fat (%BF), fat weight (FW), fat-free weight (FFW), and the lowest allowable weight-ONE [LAW1].

**LOWEST ALLOWABLE WEIGHT-TWO [LAW2]**

(This calculation always applies but is more commonly a factor when the post season deadline draws nearer.)

**Step No. 4. Number of Days of Weight Loss.** Number of days between initial certification and the first day of post season competition.

**Step No. 5. Lowest Allowable Weight-TWO [LAW2].** The lowest allowable weight is calculated by using 1.5 percent of body weight lost per week from the initial certification to certification date. The OPC will use the appropriate equation  $[BW - (.015/7) * \# \text{ of days} * BW]$  to automatically calculate the lowest allowable weight-TWO [LAW2].

**MINIMUM WRESTLING WEIGHT**

**Step No. 6. Minimum Wrestling Weight.** Select the higher value between LAW1 and LAW2 to determine minimum wrestling weight.

*NOTE: If there is concern about results from a skin-fold measurement, prior to the coach confirming the lowest allowable weight, an analysis using the "gold standards" for specific gravity (refractometer)*



*and body density (underwater weighing with a direct measure of residual volume) should be used. The use of bod pod analysis may also be used in this situation. The results of this analysis will be the final determination of the minimum wrestling weight and the appropriate wrestling weight class.*

### MINIMUM WEIGHT CLASS

**Step No. 7. Minimum Weight Class.** The certification form will display the minimum weight class the wrestler is eligible for after the minimum wrestling weight is established. The minimum weight class will be determined if the minimum wrestling weight is less than the weight class but higher than the next lower weight class.

### EXAMPLES

**No. 1.** Student-athlete A has a urine specific gravity of 1.025 on September 6. The student-athlete is instructed to return in 24 hours to be retested. Twenty-four hours later, the urine specific gravity was 1.011. The student-athlete is allowed to weigh-in and weighs 168 pounds. The skinfolds are measured and when calculated, give a body fat percentage of 12 percent. The fat weight of 20 pounds is calculated by multiplying 168 pounds by 12 percent. The fat-free weight of 148 pounds is calculated by subtracting 20 pounds from 168 pounds. The fat-free weight of 148 pounds and divided by 0.95 equals 156 pounds. This is the lowest allowable weight-ONE [LAW1] calculated with five percent body fat.

The minimum wrestling weight must consider both LAW1 and LAW2. Therefore, the higher of LAW1 and LAW2 will be the minimum wrestling weight [MWW] for the season. MWW=156.

1. Specific Gravity = 1.025
  - Specific Gravity = 1.011 (24-hours later.)
2. BW = 168 lb.
3. BF = 12%
4. FW = 168 lb. x 0.12 = 20 lb.
5. FFW = 168 lb. - 20 lb. = 148
6. LAW1 = 148 lb. / 0.95 = 156 lb.
7. # of weeks = 15 weeks.
8. LAW2 = 168 - (1.5% x 15 wks. x 168) = 130.2 lb.
9. LAW1 = 156 lb. > LAW2 = 130.2 lb.

**Therefore, LAW1=MWW=156 lb.**

**No. 2.** The next example is student-athlete B. On September 25, the urine specific gravity is 1.016, hydrated body weight is 225 pounds, and the percentage of body fat is 18 percent. This gives the wrestler a fat weight of 40.5 pounds (225 X 0.18) and a fat-free weight of 184.5 pounds (225 - 40.5). The LAW1 with five percent body fat is 194 pounds (184.5/0.95). The LAW2 is 198 pounds calculated by losing a maximum of 1.5 percent of original body weight per week [225 - (0.15 X 8) (225)]. Since the LAW2 is greater than the LAW1, the LAW2 of 198 pounds becomes the MWW. Although close, the wrestler could not compete in the 197-pound weight class but must compete at HWT (285).

If desired, the coach may choose to not confirm the certification and the student-athlete could retest using the gold standards of refractometer and underwater weighing with a direct measure of residual volume. The bod pod is another viable option for retesting. The MWW achieved with these measurements would form the basis for the certified weight class.

1. Specific Gravity = 1.016
  2. BW = 225 lb.
  3. BF = 18%
  4. FW = 225 lb. x 0.18 = 40.5 lb.
  5. FFW = 225 lb. - 40.5 lb. = 184.5 lb.
  6. LAW1 = 184.5 lb. / 0.95 = 194 lb.
  7. # OF WEEKS = 8 WEEKS
  8. LAW2 = 225 - (1.5% X 8)(225) = 198 lb.
  9. LAW2 > LAW1; therefore, LAW2 becomes MWW of 198 lb.
- Weight Class = 285 HWT**

**No. 3.** Student-athlete C is a four-year college transfer who wrestled last year for an NCAA Division II institution. This wrestler is required to complete Section I and the weight-loss plan form of the weight management program at the NCAA institution to which he or she transferred. If a student-athlete transfers from one NCAA institution to another NCAA institution after completing the Section I Certification for that season, the individual's weight management certification information for that season shall transfer to the new institution. If the student-athlete transfers to an NCAA institution from a non-NCAA institution, the individual's weight management certification information for that season does not transfer to the NCAA institution and the individual is required to complete the Section I certification process.

**No. 4.** Student-athlete D is a returning wrestler from the previous academic year. He or she must complete Section I Certification and the weight-loss plan form of the NCAA weight management program showing how much body weight can be lost in a given week over the weight-loss period and still not go below the minimum wrestling weight.



**NCAA Weight Management Program  
Urine Collection Protocol for Determination of Specific Gravity Observation of the  
Voiding Process (Validation)**

The following protocol has been established in conjunction with the standard operating procedures of the National Center for Drug Free Sport for the collection of urine for drug testing. It has been adapted for the sport of wrestling for collection of urine to determine specific gravity for weight class certification.

Provision of a urine sample for determination of specific gravity must be done under the direct supervision of a designated validator. The validator must be of the same gender as the wrestler and should be the assessor if the gender requirement allows it. If the assessor is, however, not of the same gender as the wrestler, the assessor may work with their supervisor to appoint a medical professional of the same gender to serve as the validator. The assessor is responsible for ensuring the validator is an appropriate medical staff member and fully aware of the protocol requirements outlined below.

Once the wrestler is ready to provide a specimen, he/she will be instructed to select a clean, unused urine container. Containers shall only be used once and shall be thrown away in an appropriate biohazard container following assessment of specific gravity.

**The following protocol must be followed when collecting urine for specific gravity testing.**

- The validator shall escort the wrestler to the restroom.
- The wrestler shall remove any bulky outer clothing before providing a specimen.
- The wrestler shall wash his/her hands (without soap) prior to urinating.
- The wrestler shall be instructed by the validator to raise his/her shirt to observe the midsection area and lower his/her pants to the knees.
- The validator shall monitor the voiding process to assure the integrity of the specimen.

There are many devices readily available and designed to discreetly carry urine or a urine substitute into the collection area. Collection procedures require the validator to completely observe the voiding process; therefore, standing outside the immediate area or outside the restroom is prohibited and considered a violation of the urine collection procedures. The validator must observe the urine exiting the wrestler and entering the collection container. For male wrestlers, the validator must stand to the side of the wrestler or directly in front of the wrestler to effectively view the voiding process. If a toilet stall is the only thing available, the validator must require the wrestler to position himself in such a manner that the validator can visualize the voiding process (urine from body to cup). No exceptions. For female wrestlers, the validator must observe the urine exiting the wrestler and entering the collection container from the front. Female wrestlers will be required to securely hold the collection container in front (not from behind) and urinate into the container. Any toilet stall door must be completely open during the observation of the voiding process.

In the event the wrestler needs to have a bowel movement during the specimen collection process, the following procedures must be followed.

- The wrestler must comply with all the above procedures.
- Assessor/validator will allow the wrestler to use an individual stall.
- Student athletes must place the collection container on the floor in a position where both the wrestler and the validator can fully observe the container.
- Wrestlers can then close the stall door for privacy.
- During the bowel movement process, if the wrestler needs to urinate, he/she must open the stall door prior to touching the collection container.
- The wrestler must then pick up the container under the direct observation of the validator and may then urinate into the container in full view of the validator.
- The wrestler must place the container back on the floor in a position where both the wrestler and the validator can fully observe the container.
- The wrestler can then close the stall door to clean up.
- The wrestler must open the stall door prior to picking up the container containing the urine sample.

The validator should be very alert and aware, observing the wrestler for any strange or unusual behavior such as:

- Urinating on the hands or fingers.
- Having to use a specific stall or urinal.
- Extreme hesitation or hassle when asked to raise shirt and lower pants.
- Attempting to retrieve items from a pocket.

There should never be more than one wrestler per validator in the restroom at any time. The validator's job is extremely important and should never be taken lightly. It is also important for the validator to establish a rapport with the wrestler to help put them at ease during a somewhat difficult situation.



## NCAA Weight Management Program Directions for Skin-Fold Calculations

### PURPOSE

This handbook describes the procedures used to standardize skin-fold measurements and calculate minimal weight for collegiate wrestlers. This handbook has been developed as a part of the NCAA Wrestling Weight Management Program. The purpose is to standardize the site locations, measurement techniques and equations used in the calculation of minimal weight for NCAA wrestlers. Adapted from the *Wisconsin Interscholastic Athletic Association (WIAA) Handbook for Standardizing Skin-fold Measurements and Calculating Minimum Weight* written by Robert A. Oppliger, Ph.D. and R. Randall Clark, M.S.

### BACKGROUND

Skin-fold measures assume there is a direct relationship between subcutaneous fat and overall body fatness. Through the use of a prediction equation, the skin-fold values are used to estimate an individual's percent of body fat. This value will then be used to calculate a collegiate wrestler's minimal weight at five percent body fat. The American College of Sports Medicine and the American Academy of Pediatrics have chosen five percent as the essential fat level in collegiate male athletes and the lower limit for safe and normal growth in this group.

If a wrestler needs to lose weight, the objective of the program is to encourage healthy weight loss through sound nutrition education. In addition, the prediction of percent body fat and calculation of minimal wrestling weight is an attempt to prevent wrestlers from selecting unhealthy weight classifications in which to compete. Many equations have been developed to predict percent of fat from skin-folds and their use in high school wrestlers is well documented in the exercise science and sports medicine literature. The equation selected for use by the NCAA was originally developed by Lohman (1981) and modified by Thorland, et.al (1991).

The reliability of the technique has been studied extensively and reviewed on several occasions. Research has shown coefficients of reliability  $>0.9$  when the procedures are used by experienced investigators, and inexperienced but trained testers. The skin-fold technique has been demonstrated as a valid and reliable predictor of percent fat in this population when the techniques are standardized.

### STANDARDIZATION

The key to success in skin-fold body composition assessment is standardization.

Standardization includes:

1. Standardization of skin-fold site locations and measurement techniques. All measurements must be taken at the same location and in the same way.
2. A standardized equation for predicting body density and percent fat. The Lohman three-site equation will be used to predict body density and the Brozek equation will be used to convert body density to percent body fat.
3. A minimal weight calculation based on 5 percent body fat.

## EQUIPMENT

Instruments needed:

1. Quality (for example, Harpenden, Lange or Lafayette) skin-fold calipers.
2. A tape measure, preferably steel, is needed to measure the site locations from anatomical landmarks.
3. A felt tip pen for marking sites.
4. A calibrated scale for determination of body weight at the time of skin-fold measurement.

## RAISING SKIN-FOLDS

1. Hold the skin-fold caliper in the right hand while raising the skin-fold with the thumb and index finger of the left.
2. The skin-fold should be grasped one centimeter from where the actual measurement will occur. Practice will be necessary to feel the underlying adipose tissue separate from the muscle. Hold the skin-fold firmly but do not pinch to the point of pain.
3. Measure midway between the surface and the crest of the fold. Allow the caliper paddles to gently come in contact with the skin-fold. Release the mechanism so that thumb, index finger, and caliper spring tension is supporting the skin-fold.
4. Leave the caliper paddles in contact with the skin from two to four seconds. Longer contact may actually decrease the skin-fold value due to fluid being forced from the tissue.
5. Position yourself so you are looking directly at the caliper dial, read and record the measurement to the nearest .5 millimeter.
6. Take three measurements at each site in serial fashion (for example, tricep, subscapular, abdomen, repeat). Take the median of the three values at each site and record in appropriate column.



Note: See instructions for median definition.

## SKIN-FOLD LOCATIONS

### Triceps

- The triceps skin-fold is measured on the midline of the posterior aspect of the upper arm, over the triceps muscle.
- The fold is measured midway between the posterior-lateral aspect of the acromion process of the scapula and the olecranon process of the ulna.
- The elbow should be flexed to 90 degrees to locate these landmarks.
- Use a tape measure and mark the location.
- The arm should then be extended and fully relaxed at the side to raise the skin-fold.

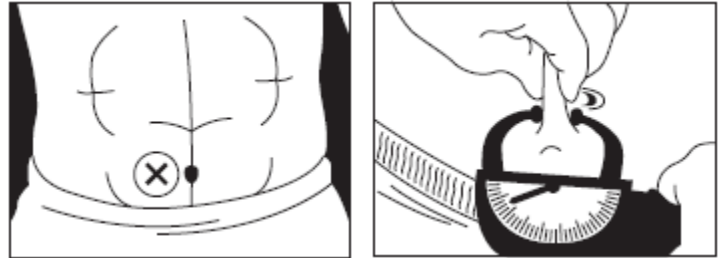


### Subscapular

- The subscapular fold is raised on a diagonal one centimeter below the inferior angle of the scapula.
- With the arms comfortably at their side palpate the vertebral border with the fingers until the inferior angle is identified. The inferior angle is the lowest point of the scapula.
- To aid identification of the site in a well-muscled athlete, place the arm behind their back. The vertebral border and inferior angle of the scapula should become more evident. In most instances the location is identified by a natural hollowing of the skin when the arm is placed behind the back.
- Return the arms to their side and be sure the shoulders are level and relaxed while raising the skin-fold.

### **Abdominal**

- The skin-fold is raised vertically on the right side of the subject's abdomen three centimeters from the midpoint of the umbilicus.
- The athlete should stand with the weight equally distributed on each leg.
- Encourage the subject to breathe normally and relax the abdominal wall.



### **CAUTIONS**

#### **Common Errors in Measuring Skin-folds**

1. Be careful to measure and mark each site. Raise the skin-fold one centimeter above that site so the caliper paddles will be directly over the marked location. The paddles should be placed one centimeter from thumb and index finger grasping the skin-fold.
2. Be cautious to make the measurements when the skin is dry. When the skin is wet the tester may grab an excessive skin-fold resulting in larger values.
3. The measurements should not be taken immediately after a workout or when the subject is overheated. Fluid shifts to the skin occur as the body attempts to cool itself. This may increase the skin-fold measurement.
4. Take special care to look directly at the caliper to avoid errors in viewing from an angle.



### **Reliability**

The ease at which you raise a skin-fold from the underlying muscle will vary by the site and the person being measured. You will discover that some athletes pose a special problem. Generally, the thicker the skin-fold the more difficult it is to reproduce the measurement. Reliability is critical to success, both within a given tester and between testers. This reliability can be improved through:

1. Careful site identification;
2. Quality training; and
3. Practice.

Once standardization is established for the measurement protocols, the tester must work to become proficient and comfortable with the procedures. Proficiency in measuring skin-folds will take many practice sessions on a variety of body types.



## REFERENCES

1. American College of Sports Medicine. Position statement on weight loss in wrestlers. *Sports Med. Bull.* 22:2-3, 1976.
2. American Medical Association. Wrestling and weight control. *J.A.M.A.* 201:541-543, 1967.
3. Behnke, A. R. and J. H. Wilmore. Evaluation and Regulation of Body Build and Composition. Engelwood Cliffs, NJ: Prentice-Hall, Inc., 1974, pp. 39-50.
4. Brownell, K. D., S. N. Steen, and J. Wilmore. Weight regulation practices in athletes: analysis of metabolic and health effects. *Med. Sci. Sports Exerc.* 19:546-556, 1987.
5. Brozek, J., F. Grande, J. T. Anderson, and A. Keys. Densitometric analysis of body composition: revision of some quantitative assumptions. *Ann. N.Y. Acad. Sci.* 110:113-140, 1963.
6. Clark, R. R., J. M. Kuta, and R. A. Oppliger. Cross validation of minimal weight prediction equations among Wisconsin high school wrestlers. *Med. Sci. Sports Exerc.* 22:SI 13, 1990
7. Clark, R. R., J. M. Kuta, T. D. Cook, W. M. Bedford, J. T. Curt, J. A. Hughes, J. D. Penner, E. A. Studesville, J. C. Sullivan, and G. L. Landry. A comparison of methods to estimate minimal weight in Wisconsin high school wrestlers. *Med. Sci. Sports Exerc.* 23:S72, 1991
8. Forsyth, H. L. and W. E. Sinning. The anthropometric estimation of body density and lean body weight of male athletes. *Med. Sci. Sports Exerc.* 5:174-180, 1973.
9. Horswill, C. A., T. G. Lohman, M. H. Slaughter, R. A. Boileau, and J. H. Wilmore. Estimation of minimal weight of adolescent males using multicomponent models. *Med. Sci. Sports Exerc.* 4:528-532, 1990.
10. Housh, T. J., G. O. Johnson, K. B. Kenney, S. L. McDowell, R. A. Hughes, C. J. Cisar, and W. G. Thorland. Validity of anthropometric estimations of body composition in high school wrestlers. *Res. Q. Exerc. Sport.* 60:239-245, 1989.
11. Hursh, L. M. Food and water restriction in the wrestler. *J.A.M.A.* 241:915-916, 1979.
12. Katch, F. I. and E. D. Michael. Body composition of high school wrestlers according to age and wrestling weight category. *Med. Sci. Sports Exerc.* 3:190-194, 1971.
13. Katch, F. I. and E. D. Michael. Densitometric validation of six skin-fold formulas to predict body density and percent body fat of 17-year-old boys. *Res. Q. Exerc. Sport.* 40:712-716, 1969.
14. Katch, F. I. and W. D. McArdle. Prediction of body density from simple anthropometric measurements in college-age men and women. *Hum. Biol.* 45:445-454, 1973.
15. Kuta, J. M., R. R. Clark, L. M. Weber, and A. Ward. Inter and intra tester reliability of skin-fold measurements in high school wrestlers. *Med. Sci. Sports Exerc.* 22:SIIO, 1990
16. Lohman, T. G. Applicability of body composition techniques and constants for children and youths. In: *Exercise and Sport Science Reviews*. Vol. 14., K.B. Pandolf (Ed.). New York: McGraw-Hill, 1986, pp.325-357.
17. Lohman, T. G. Skin-folds and body density and their relation to body fatness: a review. *Hum. Biol.* 53:181-225, 1981.
18. Malina, R. M. Physical growth and maturity characteristics of young athletes. In: *Children in Sport*, 2nd ed. R. A. Magill, M. J. Ash, and F. L. Smol (Eds.). Champaign IL: Human Kinetics, 1982, pp. 73-96.
19. Michael, E. D. and F. I. Katch. Prediction of body composition from skin-fold and girth measurements of 17 year-old boys. *J. Appl. Physiol.* 25:747-750, 1968.

20. Oppliger, R. A. Weight loss survey of high school wrestlers. The University of Iowa Hawkeye Sports Medicine Symposium, Iowa City, IA, April 1987.
21. Oppliger, R. A. and C. M. Tipton. Weight prediction equations tested and available. *Iowa Med.* 75:449-452, 1985.
22. Oppliger, R. A., R. R. Clark, J. S. Samuels, and J. H. Hughes. Testers minimally influence predictions of body fatness among high school wrestlers. *Med. Sci. Sports Exerc.* 22:SIIO, 1990 ACSM, 1990
23. Steen, S. N. and K. D. Brownell. Patterns of weight loss and regain in wrestlers: has the tradition changed? *Med. Sci. Sports Exerc.* 6:762-768,1990.
24. Sinning, W. E., N. F. Wilenskys, and E. J. Meyers. Post-season body composition changes and weight estimation in high school wrestlers. In: *Physical Education Sports and the Sciences*, J. Broukoff (Ed.). Eugene, OR: Microform Publications, 1976, pp. 137-153
25. Tchong, T. K. and C. M. Tipton. Iowa wrestling study: anthropometric measurements and prediction of a "minimal" bodyweight for high school wrestlers. *Med. Sci. Sports Exerc.* 5:1-10, 1973.
26. Thorland, W. G., G. O. Johnson, C. J. Cisar, and T. J. Housh. Estimation of minimal wrestling weight using measures of body build and body composition. *Int. J. Sports Med.* 8:365-370, 1987.
27. Thorland, W. G., G. O. Johnson, G. D. Tharp, T. G. Fagot, and R. W. Hammer. Validity of anthropometric equations for the estimation of body density in adolescent athletes. *Med. Sci. Sports Exerc.* 16:77-81, 1984.
28. Thorland W. G., C. M. Tipton, R. W. Bowers, T. J. Housh, G. O. Johnson, J. M. Kelly, T. G. Lohman, R. A. Oppliger, and T. K. Tchong. Midwest wrestling study: prediction of minimal weight for high school wrestlers. *Med. Sci. Sports Exerc.* 1991. In press.
29. Tipton, C. and T. Tchong. Iowa wrestling study: weight loss in high school students. *J.A.M.A.* 214:1269-1274, 1970.
30. Webster, S., R. Rutt, and A. Weltman. Physiological effects of a weight loss regimen practiced by college wrestlers *Med Sci Sports Exerc.* 2:229-234,1990.
31. Williford, H. N., J. F. Smith, E. R. Mansfield, M. D. Conerly, and p. A. Bishop. Validation of body composition models for high school wrestlers. *Med. Sci. Sports Exerc.* 18:216-224, 1986.



### NCAA Weight Management Program Checklist for Coach

This checklist is to assist you in your certification of wrestlers. When questions come up, please reference the full packet of information and/or the NCAA wrestling rules book.

#### Registration of a Tournament Event:

	If a hosting a tournament, register your event in the Trackwrestling system not later than midnight September 15. This registration is required to be considered an NCAA event, with all official NCAA matches eligible to count towards wrestler's Individual Season Record Form (ISRF).
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#### Weight Certification and Rules:

	View the NCAA rules and weight management presentation.
	Discuss weight management goals, guidelines, and penalties for non-compliance with the team and all support staff.
	Setup and execute a weight certification organizational meeting with your athletic trainer.
	Updated coaches' contact information in the Trackwrestling system.
	Updated the team roster in the Trackwrestling system by editing all returning wrestlers' information for: name, date of birth, year in school, email address, hometown, and state.
	Enter the first date of practice into the Trackwrestling system.
	Enter the complete team competition schedule into the Trackwrestling system.
	Discuss the desired minimum weight classification (MWC) with each wrestler before reviewing certifications.
	Review and approve or disapprove weight certifications in the Optimal Performance Calculator (OPC) system. <b>PLEASE NOTE: DO NOT RUSH when approving certifications. All approved certifications are final. When in doubt, talk to the wrestler again before approving.</b>
	A member of the coaching staff or the athletic trainer has provided each wrestler with their weight-loss descent plan.
	Review the first date wrestlers are eligible to compete at their MWC.

#### Reminders:

- Wrestlers may not be put on the Trackwrestling roster and certified until they are on the official institutional team roster.
- Preseason rostered student-athletes should have a weight certification completed prior to November 1. Injured student-athletes or student-athletes rostered after November 1 shall have a weight certification completed prior to competition.
- Wrestlers have until (on or before) the first date of postseason competition to reach or descend back to the lowest certified weight class, as determined by their individual weight-loss descent plan. There is no appeal for missing the postseason deadline.
- On the first day of postseason competition, each wrestlers' weight loss descent plan shall say:  
125.0, 133.0, 141.0, 149.0, 157.0, 165.0, 174.0, 184.0, 197.0, 285.0 or lower, to be eligible to weigh-in and compete in the postseason event at the lowest weight class.



### NCAA Weight Management Program Checklist for Assessor

This checklist is to assist you in your certification of wrestlers. When questions come up, please reference the full packet of information and/or the NCAA wrestling rules book.

	Gain access to the Trackwrestling/Optimal Performance Calculator (OPC) system.
	View the NCAA weight management presentation.
	Update the assessor's contact information.
	Discuss a proposed weight certification timeline with the coaching staff.
	Secure appropriate staff support and make facilities reservations (where applicable) needed to execute certifications.
	Ensure all equipment and supplies are available to conduct certifications.
	Develop a data collection document (e.g., Word, Excel, etc.).
	Execute the certifications and collect all data (being sure to input data within five days of collection).
	Discuss results and final minimum wrestling classification (MWC) with wrestler.
	Enter collected data into OPC within the allowable time limit.
	Reminders established to inform the coach when certifications need reviewed and confirmed.
	Print weight loss descent plans and provide them to each wrestler.
	Certification data sheets filed and schedule for destruction after five years.

#### Reminders:

- Wrestlers may not be put on the Trackwrestling roster and certified until they are on the official institutional team roster.
- Preseason rostered student-athletes should have a weight certification completed prior to November 1. Injured student-athletes or student-athletes rostered after November 1 shall have a weight certification completed prior to competition.
- Wrestlers have until (on or before) the first date of postseason competition to reach or descend back to the lowest certified weight class, as determined by their individual weight-loss descent plan. There is no appeal for missing the postseason deadline.
- On the first day of postseason competition, each wrestlers' weight loss descent plan shall say:  
125.0, 133.0, 141.0, 149.0, 157.0, 165.0, 174.0, 184.0, 197.0, 285.0 or lower, to be eligible to weigh-in and compete in the postseason event at the lower weight class.



## NCAA Weight Management Program Why The Urine Specific Gravity Cut-Off Point Is Where It Is

Why set the urine specific gravity test at 1.020? Why set the weight class at 141 or 184 or score 2 points for a takedown? As with many rules in wrestling and other sports too, the decisions are based in part on good evidence, but they are somewhat arbitrary, too.

The urine specific gravity test was chosen as a test for dehydration because it is simple to administer, non-invasive, and relatively inexpensive. The trade-off is that it is not 100 percent perfect. Physiologically, urine specific gravity has a wide range, but studies have shown that as a person dehydrates the urine specific gravity increases.

When is a person dehydrated? To test this question, we collected urine specific gravity samples from 50 wrestlers and at the same time took a blood sample to measure fluid volume in the blood. Fluid volume of the blood is a very good indicator of the body's hydration status, and there are clear cut-off points for a state of dehydration.

Using the blood's fluid volume as a criterion, we compared three urine specific gravity cut-off points to see which one most accurately classified the wrestlers as hydrated or dehydrated. We chose a fairly strict value, 1.015; a more liberal cut-off, 1.023; and a middle value, 1.020.

When the cut-off was set at 1.015, 89 percent of the dehydrated wrestlers were identified correctly, however only 13 percent of the hydrated wrestlers were correctly identified. With the cut-off set at 1.020, the number of dehydrated subjects correctly identified dropped to 80 percent, and the number of hydrated subjects correctly placed increased to 31 percent. Finally, with the cut-off raised to 1.023, only 60 percent of the dehydrated subjects were identified while the number of hydrated subjects classified correctly increased to 38 percent.

It is important to remember why this test is being used. If a wrestler dehydrates to lose weight before his body fat test and minimum weight determination, he will be doing that all season long, and potentially experience the health risks and performance decrements the new NCAA rules hope to avoid. So, it is most important that dehydrated wrestlers not proceed to the body fat test.

Conversely, a hydrated wrestler who fails the test (that is, appears dehydrated) will have to test a second time, which is inconvenient. However, there are no health or performance risks associated with coming back a second time. So, it is more important to catch dehydrated wrestlers than to miss hydrated wrestlers.

With the cut-off set at 1.020, most (80 percent) of the dehydrated wrestlers were identified and the number of hydrated wrestlers correctly placed was close to the number with a more liberal cut-off. Could the cut-off point be changed down-the-road? Do we need more data? Should we look for a better way to test for hydration? The answer to all three questions is yes. And there are more questions we may need to look at in the future. But for now, the scientific evidence supports 1.020 as a safe and attainable cut-off.



**NCAA Weight Management Program  
NCAA Competitive Safeguards and Medical Aspects of Sports  
Rationale for Hydration Measurement and 1.020 Value**

Hydration is an important component of the wrestling certification program for two primary reasons:

1. A well-hydrated state is essential for both the health and performance of any student-athlete. The NCAA Weight Management Program was developed to maintain the hydrated state before, during and after any weight changes that may occur during the August through December weight modification period. This emphasis is consistent with the stimulus for this program, three fatalities involving dehydration. Weight modification during the certification period is based on loss of body fat; hydration (water weight) should be maintained.
2. The measurement process that is the basis for the NCAA Weight Management Program can be influenced by sub-optimal hydration. One must be well hydrated to achieve maximum accuracy on body composition measurements.

Specific gravity is the most practical measure of hydration for this program.

The NCAA Committee on Competitive Safeguards and Medical Aspects of Sports considered a range of specific gravity values that should reflect a well-hydrated state. The committee agreed that 1.020 was a practical value that gave a reasonable assurance that wrestlers begin the process of weight certification in a well-hydrated state.

Any specific gravity value above this number offers less assurance of hydration, which is the primary issue addressed in the 1997-98 rules modifications.



**NCAA Weight Management Program  
Body Composition Measurements  
Air Displacement Plethysmography Using Bod Pod Technology**

**Background.**

(Transferred from the skin-fold directions for consistency.)

Using a prediction equation, air displacement plethysmography values are used to estimate an individual's percentage body fat. This value will then be used to calculate a collegiate wrestler's minimal weight at five percent body fat. The American College of Sports Medicine and the American Academy of Pediatrics have chosen five percent as the essential fat level in collegiate male athletes and the lower limit for safe and normal growth in this group.

**Equipment/Operator Requirements.**

1. The Bod Pod must be certified to be in good working order by the manufacturer annually.
2. The test operator must be certified as trained by the manufacturer or a qualified representative of the manufacturer.

**System Evaluation Protocol.**

The following should be performed each day before subject testing is permitted:

1. Warm up with the power on for at least 30 minutes.
2. Perform Analyze Hardware. Result should read "No problems detected."
3. Perform Test System. Mean volume should be within  $\pm 100\text{ml}$  of actual volume and S.D.  $< 75\text{ml}$ .
4. Calibrate or Check Scale. Mass should be within  $\pm 0.02\text{kg}$  of actual mass.
5. Ensure room temperature and pressure are stable.

**Subject Protocol.**

For accurate test results, it is important to ensure the subject:

1. Has refrained from exercise, eating, or drinking two hours prior to the test.
2. Is wearing either a form fitting "Speedo" style swimsuit OR Lycra compression shorts. *The use of wrestling singlets or other clothing items will introduce errors into the body composition results, and therefore are not allowed.*
3. Is in a completely dry (hair, skin, and clothing) and relaxed state.
4. Voids bladder before testing.
5. Removes all jewelry, watches, and eyeglasses before being weighed.
6. Wear a form fitting swim cap while inside the bod pod (unless completely shaved).

**Testing Procedure.**

1. Subject met and recorded urine specific gravity requirement immediately before testing ( $\text{SG} \leq 1.020$ ).
2. Each subject weighed on a calibrated digital scale to the nearest tenth of a pound. No rounding.
3. Subject's and technician's data entered into the computer.
4. **Brozek** equation selected from the equation options.

5. The subject is seated within the ADP chamber for two measures of body volume, each lasting about 50 seconds. The subject is encouraged to sit still and breathe normally.
6. Two body volume values should agree within 150ml; if not, a third body volume measure should be taken.
7. If two of the three volume measurements are not consistent, the system should be recalibrated and the test repeated.
8. System data should be transferred to the NCAA Weight Certification Form.