TEAMGOLDUSA | USA1 SWIMMING

CSS 400 and 200 Swim Test

Estimates critical swim speed and a practical threshold pace from maximal 400- and 200-unit time trials.

TEST PROFILE

Primary use	What it produces
Distance swimmers and middle-distance swimmers	Estimates critical swim speed and a practical threshold pace from maximal 400- and 200-unit time trials.

Controlled document: TEAMGOLDUSA club field protocol, Release R34.0.77, September 2026. This is a performance test, not a medical examination, diagnosis, or clearance to participate.

STANDARDIZED OPERATING PROCEDURE

CSS 400 and 200 Coach Protocol

Purpose. Produce a practical critical-speed estimate from two maximal front-crawl time trials. Avoid calling the value a physiological diagnosis or an exact sustainable pace.

1 Standardize the setup

Use the same course, start method, timing system, stroke, suit and equipment for both trials and future retests. Record SCY, SCM, or LCM. Complete the normal progressive team warm-up, including brief race-pace preparation.

2 Conduct the 400 trial

From the selected standardized start, swim 400 yards or meters as fast as possible with best sustainable pacing. Record total time to 0.01 when electronic timing is available or to the timer precision used.

3 Recover consistently

Use 10 to 15 minutes of standardized easy active recovery, extended when needed for safe full readiness. Record the actual recovery time and repeat it on retest.

4 Conduct the 200 trial

Using the same start and timing method, swim 200 yards or meters maximally. Record total time and any timing or pacing problem.

5 Calculate and apply

Convert both performances to seconds. CSS speed = 200 / (T400 - T200). Equivalent form: (400 - 200) / (T400 - T200). Pace per 100 = 100 / CSS speed. Report the course and unit with every result. Use the result as one input to training design and confirm with athlete response.

Safety and result boundaries

Use only with coach-selected swimmers who are currently training and can safely complete the required effort. Do not test an athlete who is ill, injured, returning without clearance, or reports concerning symptoms or a restriction. Stop for distress, chest pain, faintness, confusion, loss of coordination, unusual breathing difficulty, suspected injury, or when directed by safety personnel. Follow the facility emergency action plan. An interrupted test is not a valid comparison result.

COACH FIELD FORM

CSS 400 and 200 Recording Sheet

Record times in total seconds before calculating. Use 400 and 200 in the same pool unit; report pace in that same unit.

Date _____	**Site or pool** _____	**Course** SCY / SCM / LCM
Coach _____	**Conditions and equipment** _____	**Round** _____

Athlete	400 time	400 sec	200 time	200 sec	CSS unit/sec	Pace/100	Valid
1. _____							
2. _____							
3. _____							
4. _____							
5. _____							
6. _____							
7. _____							
8. _____							

Formula: CSS speed = (400 - 200) / (400 time in seconds - 200 time in seconds). Pace per 100 = 100 / CSS speed. Convert the pace result from seconds to minutes and seconds. Example: CSS 1.25 m/s gives 80 seconds per 100 m, or 1:20.00.

Notes, interruptions, timing method, or reasons a result should not be compared

READ BEFORE ADMINISTERING THE TEST

Medical Context and Research

This is a performance field test, not medical care. Coaches must follow club eligibility, supervision, emergency, and return-to-participation procedures.

What the result can support

The two-distance method applies the distance-time critical-speed model in a practical pool format. It can help establish a repeatable pace estimate when course, starts, timing, recovery, and athlete condition are controlled.

Important limits

Two performances do not remove normal measurement error. Starts, turns, pacing, fatigue, course, and timing method affect the estimate. CSS is not automatically identical to lactate threshold, maximal lactate steady state, or a guaranteed pace for every duration.

Source	Citation for further research
Critical swimming velocity	Wakayoshi K et al. Determination and validity of critical velocity as an index of swimming performance in the competitive swimmer. European Journal of Applied Physiology. 1992;64:153-157. doi:10.1007/BF00717953.
Physiological interpretation	Dekerle J et al. Critical swimming speed does not represent the speed at maximal lactate steady state. International Journal of Sports Medicine. 2005;26:524-530. doi:10.1055/s-2004-821227.
Model review	Jones AM et al. The maximal metabolic steady state: redefining the gold standard. Physiological Reports. 2019;7:e14098. doi:10.14814/phy2.14098.

For more research: Search the title or DOI through PubMed, Crossref, or the journal website. TEAMGOLDUSA provides citations for education and does not endorse self-diagnosis.