



China's Hypersonic Wind Tunnel Outpaces US Development

Description

China's JF-22 wind tunnel is now open for hypersonic tests. It has been running since May 2023. This wind tunnel is 167 meters long and four meters wide. It can simulate very high speeds, which helps develop fast spacecraft.

The JF-22 can simulate speeds up to Mach 30. Mach 30 is 30 times faster than the speed of sound. This speed is faster than the most advanced wind tunnel in the United States, called LENS II, which can only reach Mach 7. The JF-22 can run tests for up to 130 milliseconds, while LENS II can only run for 30 milliseconds.

The JF-22 uses chemical explosions instead of mechanical devices to create its speeds. This makes it very powerful, generating up to 15 gigawatts of power. Some experts say this wind tunnel is ahead of others by 20 to 30 years.

Many wind tunnels in America focus on testing aircraft, not spacecraft. Concerns exist about the air conditions caused by chemical explosions. It is unclear if the United States will have a wind tunnel as advanced as China's.

Vocabulary List:

1. **hypersonic** //ˌhaɪpəˈsɒnɪk// (adjective): very much faster than the speed of sound
2. **simulate** //ˈsɪmjəˌleɪt// (verb): make something act like the real thing
3. **spacecraft** //ˈspeɪskræft// (noun): a vehicle made to travel in space
4. **Mach** //mɑːk// (noun): a number that shows speed compared to sound
5. **milliseconds** //ˌmɪlɪˈsekəndz// (noun): very short times, each one thousandth of a second
6. **concerns** //kənˈsɜːnz// (noun): worries or problems people think may happen

Comprehension Questions

Multiple Choice

1. When did the JF-22 wind tunnel start running?

Option: May 2022



- Option: May 2023
- Option: June 2023
- Option: April 2023

2. How long is the JF-22 wind tunnel?

- Option: 150 meters
- Option: 167 meters
- Option: 200 meters
- Option: 130 meters

3. What is the maximum speed that the JF-22 can simulate?

- Option: Mach 20
- Option: Mach 25
- Option: Mach 30
- Option: Mach 15

4. How fast is Mach 30 compared to the speed of sound?

- Option: 10 times
- Option: 20 times
- Option: 30 times
- Option: 40 times

5. What is the maximum test duration of the JF-22?

- Option: 100 milliseconds
- Option: 130 milliseconds
- Option: 50 milliseconds
- Option: 60 milliseconds

6. What is the maximum speed that LENS II can reach?

- Option: Mach 5
- Option: Mach 6
- Option: Mach 7
- Option: Mach 8

True-False

7. The JF-22 wind tunnel is located in the United States.



8. LENS II can run tests for a longer duration than the JF-22.
9. Chemical explosions are used in the JF-22 to generate speeds.
10. The JF-22 is considered to be 20 to 30 years ahead of other wind tunnels.
11. Many wind tunnels in America are focused on testing spacecraft.
12. The JF-22 can simulate higher speeds than the LENS II wind tunnel.

Gap-Fill

13. The JF-22 wind tunnel has been running since _____.
14. The JF-22 can simulate speeds up to Mach _____.
15. The LENS II wind tunnel can only reach speeds of Mach _____.
16. Chemical explosions in the JF-22 wind tunnel generate up to _____ gigawatts of power.
17. The maximum test duration of LENS II is _____ milliseconds.
18. Many wind tunnels in America focus on testing _____, rather than spacecraft.

Answer

Multiple Choice: 1. May 2023 2. 167 meters 3. Mach 30 4. 30 times 5. 130 milliseconds 6. Mach 7

True-False: 7. False 8. False 9. True 10. True 11. False 12. True

Gap-Fill: 13. May 2023 14. 30 15. 7 16. 15 18. aircraft

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. What is often used to explore outer space?



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- Option: Submarine
Option: Spacecraft
Option: Helicopter
Option: Airplane
2. What term is used to describe a specific task or goal in space exploration?
Option: Project
Option: Operation
Option: Mission
Option: Assignment
3. What do scientists rely on to gather data from space?
Option: Experiments
Option: Observations
Option: Tests
Option: Surveys
4. What term describes speeds greater than five times the speed of sound?
Option: Subsonic
Option: Supersonic
Option: Hypersonic
Option: Transonic
5. What is the primary component that provides thrust for a spacecraft?
Option: Wing
Option: Engine
Option: Control system
Option: Fuel
6. What is the term used to describe the speed of sound in air?
Option: Kilometers per hour
Option: Mach
Option: Time
Option: Velocity
7. What is the term for a material that has lost moisture?
Option: Overhydrated
Option: Dehydrated
Option: Saturated
Option: Liquid
8. What type of presentation showcases the capabilities of a product?
Option: Lecture



- Option: Workshop
- Option: Demo
- Option: Course

9. What action is taken to initiate the propulsion of a rocket?

- Option: Launching
- Option: Firing
- Option: Igniting
- Option: Starting

10. What is a gathering for hands-on activities and discussions called?

- Option: Conference
- Option: Webinar
- Option: Workshop
- Option: Seminar

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. The latest _____ was successfully launched into orbit.
12. NASA's next _____ aims to explore the surface of Mars.
13. The _____ taken by the telescope revealed new stars.
14. The prototype test was conducted at _____ speeds.
15. After the upgrade, the _____ operates more efficiently.
16. The aircraft flew at a speed of 2.5 _____.
17. The technician reviewed the _____ samples collected from the planet.
18. The company held a _____ to showcase their new product.
19. The team practiced _____ the engines in a controlled environment.
20. Participants learned a lot at the recent science _____ on space exploration.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. The spacecraft was designed to withstand extreme temperatures during re-entry.



22. The mission successfully gathered data from the asteroid belt.
23. The observations from the satellite provided crucial information about climate change.
24. Hypersonic technology is being developed to enhance flight speed dramatically.
25. The engine of the rocket was tested multiple times for reliability.
26. Traveling at Mach 3 is an incredible achievement for any aircraft.
27. The dehydrated food supplies were ideal for long-duration space missions.
28. The demo showcased the innovative features of the new rover.
29. The firing of the thrusters allowed the spacecraft to change its trajectory.
30. The workshop included hands-on activities related to rocket science.

Answer

Multiple Choice: 1. Spacecraft 2. Mission 3. Observations 4. Hypersonic 5. Engine 6. Mach 7. Dehydrated 8. Demo 9. Firing 10. Workshop

Gap-Fill: 11. spacecraft 12. mission 13. observations 14. hypersonic 15. engine 16. Mach 17. dehydrated 18. demo 19. firing 20. workshop

Matching sentence: 1. spacecraft 2. mission 3. observations 4. hypersonic 5. engine 6. Mach 7. dehydrated 8. demo 9. firing 10. workshop

CATEGORY

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1. China
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6. wind tunnel

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