

Clean Hot Smoke Machine Testing

Testing with Clean Hot Smoke to simulate a real fire.



What is the Clean Hot Smoke Machine?

A clean hot smoke machine generates real, non-toxic smoke up to 24 m³ /s that does not damage tunnels, buildings or underground installations. It is mobile and modular, allowing us to carry out on-site tunnel ventilation tests and fire drills for public or private clients.

Technical characteristics of the Clean Hot Smoke Machine

The clean hot smoke machine has the following characteristics:

- **Smoke flow rate** production up to **1460 m³/min.**
- **Comparable to a 5 MW / 8 MW fire.**
- **Autonomy** without recharging consumables: up to 1 hour.
- Hot smoke outlet **temperature** to favour smoke stratification.

How does the Clean Hot Smoke Machine work?

In order to simulate a real fire during our [fire tests](#) in installations, it is necessary to create:

- **Opaque** smoke to simulate poor visibility.
- **Hot** smoke to promote natural stratification, as would happen in the event of a fire.
- **Clean** smoke with **temperatures below 80°C**; harmless for existing installations and people.

The system of equipment developed by [Applus+ TST](#) creates these test conditions. In other words, it allows smoke generation with a temperature regulation of up to 80°C at the smoke outlet. In this way, the smoke temperature does not damage the equipment of the roof structure, but it does favour the stratification of the smoke in order to be able to test the [emergency systems](#) of both the **fire protection system and the ventilation systems in situ**.

Clean Hot Smoke Machine Tests

Applus+ TST's clean smoke service is aimed at those organisations that need:

- Evaluation of smoke performance, and testing of extraction and ventilation systems.
- Evaluation of the performance of detection and [alarm systems](#) in the event of a fire.
- Carrying out drills, [creating scenarios](#) and practical assumptions for emergency services.
- Implementation and evaluation of emergency, evacuation and self-protection plans.

In addition, the hot smoke machine is transported on a light truck, which gives it the **flexibility to change the test site quickly if there is road access**. It also has small wheels that allow it to be moved for positioning.

A Smoke Machine with an adjustable flow rate

The machine can be regulated by adding more or less generators, which allows us to offer different performances according to the smoke flow rate to be generated.

It allows for a **smoke production of up to 24 m³/s**, with similar **smoke outlet temperatures** that won't damage the equipment or the roof structure. The smoke production is 'comparable' to the **smoke generation of a 5MW / 8MW fire**.

SMOKE MACHINES	Smoke flow rate m3 /min	Smoke flow rate m3 /s	Comparable fire power
SINGLE MACHINE	580	9,66	2-3 MW
DOUBLE MACHINE	1460	24,32	5-8 MW

NOTE: If the tests require lower power and smoke flow rates, Applus+ TST offers complementary engineering services, using a validated calculation with a lower smoke production test.

Why choose Applus+ TST for Clean Hot Smoke Machine Testing?

We have extensive experience and are European leaders in tunnel and ventilation system testing.

- **Speed:** we go to any site and adapt the service to the client's needs.
- **Reliability:** our service always has a technician operator who installs and operates the machine and a specialised technician who supervises and coordinates the tests, guaranteeing that everything goes according to plan.
- **Quality of information:** we guarantee the reliability of the data recorded, in the case of mediations, and we offer a report attesting to the test if the client so wishes.
- **Adaptability:** our machine can work at full or half flow. In addition, if the tests require higher power or smoke flow rates, our engineering service can generate a scaled calculation, validating it with a lower smoke production test.
- **Benefit:** our tests and simulations help operators and concessionaires to comply with tunnel legislation which, among other things, requires realistic simulations to be carried out. In the field of building and industry, we cooperate with fire prevention services and authorities in the validation of performance projects.