

Permit for trial operation with self-driving vehicles: description of the application process

1. Applicable legislation

In 2017, the Swedish Ministry of Enterprise and Innovation issued *Ordinance (2017:309) on Trial Operation with Self-driving Vehicles*¹ that allows trial operation with self-driving vehicles to take place.

What is meant by “self-driving vehicle” and “trial operation”?

By self-driving vehicle is meant a vehicle that has a fully or partially automated driving system. Trial operation refers to activities that involve the operation of a self-driving vehicle to test and evaluate automatic functions that are not part of a type approval, individual approval or registration inspection according to the Swedish *Vehicle Act (2002:574)*.

Permission from the Swedish Transport Agency

The ordinance states that trial operations with self-driving vehicles may only be carried out with permission from the Swedish Transport Agency.

A permit may only be granted if the applicant shows that traffic safety can be ensured during the trial and that the trial does not cause any significant disruption or inconvenience to the surroundings. The ordinance also states that when tests are performed with a self-driving vehicle, there must be a physical driver inside or outside the vehicle.

The Swedish Transport Agency has issued *The Swedish Transport Agency's Regulations and General Advice (TSFS 2017:92) on Permission to Conduct Trials with Self-driving Vehicles*² that elaborate on

- what an application shall contain, as a minimum;
- requirements for control of the trial activities;
- requirements regarding communication/reporting to the authority; and

¹ https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/forordning-2017309-om-forsoksverksamhet-med_sfs-2017-309

² https://www.transportstyrelsen.se/TSFS/TSFS%202017_92.pdf
These legislations are unfortunately only available in Swedish

- requirements regarding evaluation of trial operations.

Those granted a permit by the Swedish Transport Agency will not be exempt from requirements contained in other regulations that the trial operation may be subject to. E.g. for trials with self-driving buses with passengers, the applicant needs a traffic permit for public transport.

2. Process and requirements to obtain a permit

The overall process to obtain a permit is as follows:

1. The applicant first submits a letter of interest.
2. We arrange an initial meeting with the applicant, where we will ask them to present their plan with the trial operation and their technology. We will also inform them about the application process, the safety requirements etc. and our fees and charges.
3. When we have received the application, we will process it by reviewing the enclosed documents. If necessary, we will ask for additional information, have further meetings, visit the applicant for demonstrations etc. The Swedish Transport Agency prefers to have all information sent to us, but sometimes actual demonstrations are necessary. Also, in some cases, the applicant is unwilling to send us classified documents, preferring to show them to us at their facilities.
4. For some trial operations, the actual route of the experiment needs to be scanned by the vehicle before the operation can begin. In these cases, we issue a temporary permit.
5. When the application has been processed and we find that it is complete and fulfills the requirements stated in ordinance 2017:309 and regulations TSFS 2017:92, we will issue two permits: one for the trial operation and one for the vehicle(s).
6. During the trial operation, the applicant is obliged to report any incidents. For some permits, we have terms that allow us to audit the applicant to check that they follow their own processes as described in their application.
7. Every year, the applicant shall submit a written report about the trial operation.

Please see the appendix for a flowchart of the process.

Regarding the content of the application, the following topics must be covered:

1. The applicant's contact information.
2. The names of the persons responsible for the trial activities, as well as their addresses and personal or corporate identity numbers.
3. Description of how the trial operation should be managed and how responsibility should be distributed within the trial operation team.
4. Overall description of the purpose and objectives of the trial operation.
5. Description of the fully or partially automated functions to be tested and evaluated in the trial.
6. Description of how the trial operation will be carried out and evaluated.
7. Information about the geographical area and the streets or roads where the trial operation will be conducted.
8. Risk assessment showing that the risks associated with the trial operation are managed to an acceptable level and that the trial operation will not cause any significant inconvenience to the surroundings.
9. The name(s) of the owner(s) of the vehicles included in the trial.
10. Technical description of the vehicles included in the trial.
11. Need for exemption under Chapter 8 Section 18 of the Swedish *Vehicle Ordinance (2009:211)*.
12. Any other information relevant to the processing of permits.

At least two permits are required

The permit for the trial operation consists of at least two different permits: One permit grants the use of the vehicle with all the necessary exemptions on certain roads or defined areas; the other permit is for the whole trial including the vehicles the permit is valid for. Both permits are required to operate the vehicle on public roads in automated mode. These permits are time limited and may be assigned terms and conditions.

The driver of the self-driving vehicle

The current legislation does not allow for trial operations without a physical driver. However, the driver can be located outside the vehicle.

The application process will be the same regardless of whether the safety driver is inside or outside the vehicle. It is up to the applicant to show that the trial operation is safe. As the scenario with a safety driver outside the vehicle will require some form of remote operation, the

safety case needs to be more focused on the technical solution and the validation of the technology.

3. Safety case and risk assessment

We do not have any specific requirements regarding the safety of these trials except that traffic safety shall be ensured during the trial and that the trial must not cause any significant disturbance or inconvenience to the surroundings. As mentioned above, the regulations also state that when a self-driving vehicle is operated, there must be a physical driver inside or outside the vehicle.

Required contents of the risk assessment

The Swedish Transport Agency's regulations TSFS 2017:92 states that the applicant shall submit a risk assessment of the test activities. This assessment shall include an analysis of the vehicle and all other activities related to the trial operation, such as maintenance, organization etc.

The hazards that the applicant identifies need to be mitigated to an acceptable level of safety. The acceptance criteria for a sufficient level of safety must be specified by the applicants themselves. The Swedish Transport Agency requires evidence that mitigations have been implemented related to identified hazards. E.g. if the applicant mitigates a hazard with a technical solution, we will require to see the technical documentation; if a hazard is mitigated with routines, we will require to see these; and if hazards are mitigated with safety drivers, we will require to see relevant parts of the training as well as specified requirements for the safety drivers.

Our regulations also state that the applicant has to ensure that those who participate in the trial activities have appropriate competence for the task.

The vehicle's compliance with the traffic regulations

As part of the permit process, we require the applicant to show how the vehicle fulfills the Swedish *Traffic Ordinance (1998:1276)*. This is to ensure that the self-driving vehicle follows the applicable traffic regulations for the chosen route or location. If any regulations are not covered by the self-driving functions, they will have to be handled by the safety-driver.

System – driver interaction

An important part of the safety case is the interaction between the technical system and the safety driver. We require to see evidence that the safety driver can in fact act as the barrier he or she should be (if that is the case, based on the risk assessment). That means that the safety driver's reaction time has to be considered in the systems regulation and that the safety driver can take control of the vehicle (e.g. by pressing the emergency stop button). When it comes to control strategies and reaction times, more information is available under the UNECE regulations ALKS (ACSF b2).

4. Incident reporting and trial evaluation

When a trial operation is underway, the applicant is required to report any incidents that involve the self-driving vehicle (both directly and indirectly).

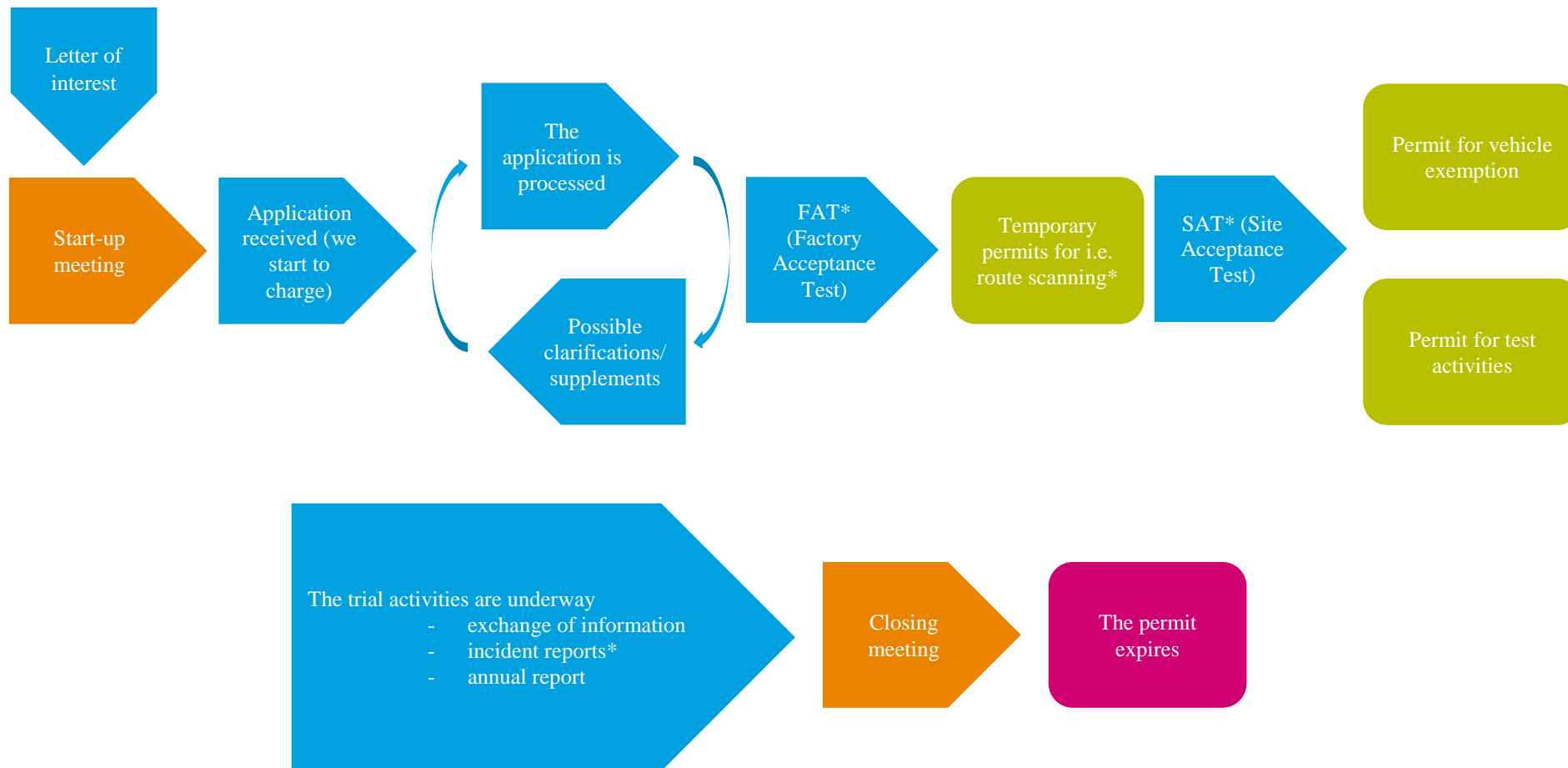
We require an evaluation report at the end of the trial, and if the trial spans over several years we require a status report every year.

5. Fees and charges

The Swedish Transport Agency's activities in the form of permit processing, supervision and registry keeping shall mainly be financed with fees. The Swedish Transport Agency will charge a running fee to process a permit for trial operation with self-driving vehicles. The current hourly rate can be found on our website³ and must be paid for every 30-minute period commenced.

³ <https://www.transportstyrelsen.se/sv/Om-transportstyrelsen/Avgifter/Vagtrafik/Avgifter-for-tillstands--och-andra-provningar/Fordon/>

Appendix - The application process



* - when applicable