



HIGHLY AUTOMATED VEHICLE (HAV) CERTIFICATE OF COMPLIANCE GUIDELINES



In accordance with 75 Pa.C.S. §8505(b)(5), these guidelines establish minimum requirements for the certification and operations of Highly Automated Vehicles (HAVs) operated by an HAV driver, present in the vehicle or from a remote location, or without an HAV Driver (Driverless Operations). These guidelines refer to the self-certification for a Certificate of Compliance that Highly Automated Vehicles meet the requirements of 75 Pa.C.S. §8505(b)(5), and do not replace (and are in addition to) vehicle manufacturer self-certification requirements under the Federal Motor Vehicle Safety Standards.

1. Certification of Compliance

- (a) **Prohibition.** No firm, copartnership, association, corporation or educational or research institution may operate an HAV on a highway in this Commonwealth, unless:
 - 1. The Department issues a Certificate of Compliance; and
 - 2. The HAV is operated in accordance with 75 Pa.C.S., these guidelines, and any other guidelines or policies published by the Department.
- (b) **Applicability.** This section shall not apply to:
 - 1. A highly automated work zone vehicle operated in accordance with 75 Pa.C.S. §8531.
 - 2. A Platoon operated in accordance with 75 Pa.C.S. §8532.
 - 3. An HAV registered in another state operating in the Commonwealth under an interstate agreement in accordance with 75 Pa.C.S. §8510.5.
- (c) **Request for certification.** An Applicant shall request a Certificate of Compliance through a digital form on the Department's publicly accessible Internet website.
- (d) **Self-certification form.** Where applicable, the self-certification form submitted to the Department shall include:
 - 1. The name, address, and contact information of the Applicant.
 - 2. A principal point-of-contact for the Applicant's Accident claims and registered agent for service of process.
 - 3. License plate number and jurisdiction of issuance of each HAV.
 - 4. Vehicle Identification Number (VIN) of each HAV, if issued.
 - 5. The United States Department of Transportation (USDOT) number for each commercial HAV, if applicable.
 - 6. Year, make, and model of each HAV.
 - 7. Engine type for each HAV.
 - 8. Whether the HAV is a Low-speed Highly Automated Vehicle.
 - 9. Proof of registration for each HAV.
 - 10. SAE J3016 designed level of driving automation
 - 11. Proof of insurance required by 75 Pa.C.S. § 8508 (f).
 - 12. If applicable, expectations of remote HAV Driver(s) and responsible functions outside of the dynamic driving task.
 - 13. Location of the remote HAV Driver(s), if applicable.
 - 14. Whether the HAV is wheelchair accessible.
 - 15. Any vehicle amenities for drivers or passengers with disabilities.

16. Legal name of each HAV Driver.
17. Driver license number and state or country of issuance for each HAV Driver.
18. Latest training completion date for each HAV Driver.
19. Number and location of Safety Associates within the HAV(s), if applicable.
20. Whether the HAV(s) will transport passengers and/or goods.
 - i. The provisions of 66 Pa.C.S. (relating to public utilities) shall apply to a Certificate Holder and the Certificate Holder's HAV(s).
21. Whether a fare is charged to passengers.
22. A copy of any Terms and Conditions that a passenger agrees to when riding in the HAV, if applicable.
23. A description of the service or function being provided by the HAV if not transporting passengers or goods.
24. Municipalities where the HAV(s) is/are expected to operate.
25. A Safety Management Plan as detailed in Section 2 of this document.
26. Emergency Service Responder procedures as detailed in Section 8 of this document.
27. If applicable, nonproprietary documentation submitted to the National Highway Traffic Safety Administration that resulted in an exemption to Federal Motor Vehicle Safety Standards.
28. If the submitting Applicant is not the Developer of the ADS, the Applicant shall provide a letter from the Developer confirming that all information contained within the Self-Certification regarding their ADS hardware and software is accurate as stated or attests that coordination with the Developer has occurred prior to completing the Self-Certification to ensure that the information submitted is accurate as stated.
29. Consents:
 - i. The HAV shall operate in compliance with 75 Pa.C.S. and all applicable federal laws and regulations.
 - ii. The jurisdiction of courts of this Commonwealth for actions arising out of or resulting from any Accident involving the HAV in this Commonwealth.
30. Certifications:
 - Vehicle Operation**
 - i. The Applicant has implemented a Safety Culture.
 - ii. The Applicant has performed a risk evaluation and appropriately mitigated risks associated with the HAV, the ADS, the intended Operational Design Domain (ODD), and if applicable, the HAV Driver.
 - iii. The Applicant has implemented measures to evaluate the effectiveness of risk mitigation measures.
 - iv. The Applicant has developed and implemented metrics to assess the performance of the HAV.
 - v. Quality controls are deployed and monitored to ensure the self-

certification is implemented, adhered to, and measured to ensure safe operations.

HAV Driver

- vi. The Applicant has established quality standards for HAV Drivers.
- vii. The HAV Driver is properly licensed for the type and class of motor vehicle.
- viii. The HAV Driver can appropriately interact with all roadway users and conditions within the intended ODD.
- ix. A criminal background and driver record checks have been performed for all HAV Drivers.
- x. HAV Drivers have received training on the operation of the HAV.
- xi. HAV Drivers have received training on decision-making process of when to engage or disengage the ADS.
- xii. HAV Drivers have received training on the functionality and limitations of the ADS and the HAV.
- xiii. The Applicant has implemented measures to monitor and address HAV Driver fatigue, inattentiveness, impairment, and carelessness.
- xiv. HAV Drivers have been given training on Drug and Alcohol Impairment Awareness, including both prescribed and unprescribed controlled substances. Reference to drug and alcohol testing must explicitly refer to DOT Part 40 requirements for commercial drivers.
- xv. The Applicant has implemented safety measures and/or training in the event the ADS disengages without reaching a Minimal Risk Condition.
- xvi. The Applicant has implemented an HAV Driver training program that addresses basic driving skills including vehicle operations, Hazard perception, response to malfunctions, response to sudden emergencies, response to driving distractions, response to aggressive drivers, and response to adverse weather conditions.
- xvii. The HAV Driver conducts pre-trip planning.
- xviii. All HAV Drivers must successfully complete a training program approved by the Applicant and perform remedial training when determined necessary.
HAV Driver in a remote location
- xix. The Applicant has established quality standards for HAV Drivers.
- xx. The HAV Driver is properly licensed for the type and class of motor vehicle.
- xxi. The HAV Driver can appropriately interact with all roadway users and conditions within the intended ODD, when applicable.
- xxii. A criminal background and driver record checks have been performed for all HAV Drivers.
- xxiii. HAV Drivers have received training on the operation of the HAV.
- xxiv. HAV Drivers have received training on decision-making process of when to engage or disengage the ADS.
- xxv. HAV Drivers have received training on the functionality and limitations of

the ADS and the HAV.

- xxvi. The Applicant has implemented measures to monitor and address HAV Driver fatigue, inattentiveness, impairment, and carelessness.
- xxvii. HAV Drivers have been given training on Drug and Alcohol Impairment Awareness, including both prescribed and unprescribed controlled substances. Reference to drug and alcohol testing must explicitly refer to DOT Part 40 requirements for commercial drivers, if applicable.
- xxviii. The Applicant has implemented safety measures and/or training in the event the ADS disengages without reaching a Minimal Risk Condition.
- xxix. The Applicant has implemented an HAV Driver training program that addresses basic driving skills including vehicle operations, Hazard perception, response to malfunctions, response to sudden emergencies, response to driving distractions, response to aggressive drivers, and response to adverse weather conditions.
- xxx. The HAV Driver conducts pre-trip planning.
- xxxi. All HAV Drivers must successfully complete a training program approved by the Applicant and perform remedial training when determined necessary.
- xxxii. The applicant has evaluated proposed operations and has determined what the appropriate ratio of HAV Drivers to HAVs undergoing remote operations is and ensures that ratio is maintained during operations.
- xxxiii. The applicant has implemented procedures to achieve a Minimal Risk Condition when the DDT cannot be completed as planned, such as loss of power or connectivity.

Vehicle with an HAV Driver on board or in a remote location

- xxxiv. The HAV is capable of fault detection.
- xxxv. The HAV is capable of identifying and obeying Traffic-control Devices.
- xxxvi. The HAV will operate in compliance with the submitted self-certification form including Safety Management Plan.
- xxxvii. Cybersecurity risks have been considered and reasonable measures, which may include industry standards, best practices, company policies, or other methods, have been implemented to mitigate the risks.
- xxxviii. The HAV has been tested to ensure that it can safely operate in its intended ODD. The ADS and the HAV can appropriately interact with all roadway users, including Vulnerable Road Users, and conditions within the intended ODD.
- xxxix. Software and systems engineering processes best practices and/or standards were utilized when developing safety related elements for the ADS and the HAV. Best practices and/or standards will continue to be updated as applicable.
- xl. Verification and validation methodologies have been developed and

implemented.

- xli. The Applicant has implemented routine maintenance and inspection cycles.
- xlii. The Applicant has implemented quality control processes for components integrated into the ADS, including those manufactured by third parties.
- xliii. The HAV can alert the HAV Driver if the ADS cannot perform the Dynamic Driving Task.
- xliv. The HAV has a mechanism to engage and disengage the ADS that is easily accessible.
- xlv. The HAV has a mechanism to indicate to the HAV Driver when the automated vehicle system is engaged.
- xlvi. The HAV is equipped with a means to store operational data and stores operational data as necessary.
- xlvii. The appropriate vehicle equipment standards have been implemented in accordance with 75 Pa.C.S. § 4103 (f).

Vehicle utilizing Driverless Operations

- xlviii. The HAV is capable of fault detection.
- xlix. The HAV is capable of identifying and obeying Traffic-control Devices.
 - I. The HAV will operate in compliance with the submitted self-certification form including Safety Management Plan.
 - ii. Cybersecurity risks have been considered and reasonable measures, which may include industry standards, best practices, company policies, or other methods, have been implemented to mitigate the risks.
 - iii. The HAV has been tested to ensure that it can safely operate in its intended ODD.
 - liiii. The ADS and the HAV can appropriately interact with all roadway users, including Vulnerable Road Users, and conditions within the intended ODD.
 - liv. The HAV can achieve a minimal risk condition should a failure of the ADS occur which renders the ADS unable to perform the entire DDT within the intended ODD.
 - lv. Software and systems engineering processes best practices and/or standards were utilized when developing safety related elements for the ADS and the HAV. Best practices and/or standards will continue to be updated as applicable.
 - lvi. Verification and validation methodologies have been developed and implemented.
 - lvii. The Applicant has implemented routine maintenance and inspection cycles.
 - lviii. The Applicant has implemented quality control processes for components including those manufactured by third parties.
 - lix. The HAV is equipped with a means to store operational data and stores

- operational data as necessary.
- Ix. The appropriate vehicle equipment standards have been implemented in accordance with 75 Pa.C.S. § 4103 (f).
 - Ixi. The HAV is capable of identifying and yielding to emergency services responding to incidents.
- (e) **Guidelines.** The Department may expand self-certification form requirements through the issuance of additional guidelines or policies in accordance with 75 Pa.C.S. § 8505 (b) (5).
 - (f) **Self-certification review.** The Department shall review the self-certification form to ensure the form is complete, contains accurate information, and meets the requirements of 75 Pa.C.S. and these guidelines.
 - 1. The Department may ask clarifying questions and request information, or records deemed reasonably necessary to aid the Department's review of the submitted application.
 - (g) **Notification of issuance.** The Department shall provide written notification to the Applicant. If the application is not rejected within 30 days of the date of receipt by the Department, the self-certification form shall be considered complete, and a Certificate of Compliance shall be issued to the Applicant.
 - 1. If declined, PennDOT shall provide a written explanation to the Applicant providing the reasons why the application was declined and provide an opportunity to meet. The Applicant may resubmit until authorization is granted.
 - (h) **Modification.** A Certificate Holder shall promptly notify the Department of any material changes in the self-certification form, such that the submitted information no longer accurately or adequately describes the scope of operation.
 - 1. The Department shall post notification guidelines on the Department's publicly accessible Internet website.

2. Safety Management Plan

- (a) **Plan.** The Safety Management Plan describes the elements considered in the development and management of the HAV including the safety elements of the HAV's ODD, ADS, and HAV Driver.
- (b) **Structure.** The Safety Management Plan shall be separated by form of HAV operations:
 - 1. Operations with an HAV Driver on board
 - 2. Operations with an HAV Driver in a remote location
 - 3. Driverless Operations
- (c) **General content.** The Safety Management Plan shall include at a minimum:
 - 1. Safety elements of the ADS.
 - 2. A general overview of the intended ODD for testing including:
 - i. Physical Infrastructure (e.g., roadway types)
 - ii. Operational Constraints (e.g., speed limit or traffic conditions)
 - iii. Objects (e.g., roadway users including Vulnerable Road Users, and non-

- roadway user obstacles/objects)
- iv. Connectivity (e.g., remote fleet management system).
 - 1. For Operations with an HAV Driver in a remote location, detail how connection will be maintained, expected and acceptable latency for operations, and continuity plans when connectivity is lost.
- v. Environmental Conditions (e.g., weather, particulate matter, and illumination)
- vi. Zones (e.g., geo-fencing and school/work zones)
- 3. The Dynamic Driving Task Fallback procedures.
- 4. The Minimal Risk Condition determination criteria.
- 5. A description of how the ADS is disengaged.
- 6. Actions taken to ensure the HAV operations align with industry best practices and/or standards.
- 7. The HAV Driver training program and evaluation criteria, if applicable.
- 8. A description of the criminal background and driver record checks required by the Applicant for HAV Drivers, if applicable.
- 9. Procedures in the event of an Accident.
- 10. Response procedures if the HAV becomes disabled, immobilized, or encounters situations outside of its intended ODD.
- 11. A Safety Case framework for the certifications within the self-certification form.
- (d) **Guidelines.** The Department may expand Safety Management Plan requirements through the issuance of guidelines in accordance with 75 Pa.C.S. § 8505 (b) (5).

3. Municipal Notification

- (a) **Notice required.** A Certificate Holder shall notify the Municipal Authority of the intent to operate an HAV within the boundaries of the Municipality at least 10 days prior to commencing operations.
- (b) **Form of notice.** The notice shall be provided to the Municipal Authority via physical or digital written communication.
 - 1. The notification shall include at a minimum the name of the Certificate Holder, the manufacturer make and model of the HAV(s), a description of the service or function being provided by the HAV, contact information for the Certificate Holder or a person on behalf of the Certificate Holder, and the content of Section 8, Emergency Service Responder Procedures.
- (c) **Department notice.** A Certificate Holder shall notify the Department of the date, recipient, and method of notification. Carbon copy of Department personnel on notifications to the Municipality is acceptable.

4. Visual Identifier

- (a) **Purpose.** To ensure compliance with 75 Pa.C.S. § 8508 (d) the Certificate Holder shall

- display an external-facing visual identifier on the HAV.
- (b) **Content.** The visual identifier to meet the standards as set forth by the Department.
 - (c) **Specification and placement.** The Department shall post specification and placement guidelines on the Department's publicly accessible Internet website.

5. Ongoing Reporting

- (a) **Reporting.** A Certificate Holder shall continue to provide information or records that may be required by the Department and reasonably necessary for the administration and enforcement of 75 Pa.C.S. and these guidelines.
- (b) **Accident reporting.** A Certificate Holder shall self-report to the Department an Accident in this Commonwealth involving the Certificate Holder's HAV if the Accident resulted in Bodily Injury, serious Bodily Injury, death, or damage to property.
 - 1. The Department shall post reporting guidelines on the Department's publicly accessible Internet website.
- (c) **Compliance reporting.** A Certificate Holder shall provide periodic reports to the Department to demonstrate compliance with 75 Pa.C.S. and these guidelines.
 - 1. The Department shall post reporting guidelines on the Department's publicly accessible Internet website.
- (d) **Safety reporting.** By order of the Secretary, a Certificate Holder shall provide information or records if there is a specific safety concern.
 - 1. Details on the requested information or records shall be sent to the Certificate Holder by written communication.

6. Suspension and Revocation

- (a) **Suspension.** The Department may only suspend or limit a Certificate of Compliance in accordance with 75 Pa.C.S. § 8510.1(b).
 - 1. The Department shall update its publicly accessible Internet website upon issuance.
- (b) **Revocation.** The Department may only revoke a certificate in accordance with 75 Pa.C.S. § 8510.1(b).
 - 1. The Department shall update its publicly accessible Internet website upon issuance.
- (c) **Appeal.** The Department shall provide a notice and an opportunity for an administrative hearing to a Certificate Holder whose Certificate of Compliance is suspended, limited, or revoked.

7. Prohibition

- (a) **Hazardous operation.** By order of the Secretary, the Department may prohibit the use of an HAV on a highway where the Secretary determines that the operation of the HAV would constitute a Hazard.

1. Orders shall be displayed on the Department's publicly accessible Internet website.
- (b) **Highly Automated Vehicle Driver.** The Department may prohibit or restrict an HAV Driver if the HAV Driver has been convicted of one or more moving violations within the past 365 days.
 1. The Department shall provide written notification to the Certificate Holder of any prohibitions or restrictions.

8. Emergency Service Responder Procedures

- (a) **Procedures.** The Emergency Service Responder procedures shall outline the recommended steps an Emergency Service Responder should take when interacting with an HAV.
- (b) **Minimum procedures.** Emergency Service Responder procedures shall include at a minimum:
 1. How to identify the HAV.
 2. How to secure the HAV.
 3. Location of the HAV registration and proof of insurance.
 4. Extraction considerations.
 5. Towing considerations.
 6. Firefighting considerations.
 7. Considerations for a disabled or immobilized HAV.
 8. Post-crash considerations.
- (c) **Modification.** A Certificate Holder shall promptly notify the Department of any material changes to the Emergency Service Responder procedures.

9. Interstate Agreements

- (a) **Agreement.** The Department may negotiate one or more interstate agreements on behalf of the Commonwealth with regulatory agencies of other states for the interstate operation of HAVs and platoons approved for operation in the Commonwealth and for HAVs and platoons approved for operation in states that are parties to the agreement.
- (b) **Approval required.** An interstate agreement negotiated by the department under subsection (a) shall become effective upon approval by the Governor.
- (c) **Regulations.** The department may promulgate regulations governing the interstate operation of highly automated vehicles and platoons consistent with 75 Pa.C.S. Chapter 85 and the interstate agreement.
 - a. The Department will list all States with executed interstate agreements on its publicly accessible Internet website. Notification will be sent to all Certificate Holders when a new interstate agreement is executed.
- (d) **Limitation.** The following shall apply:
 - a. An interstate agreement shall only be approved by the Governor if permitted under Federal law or regulation and shall be consistent with Federal law or

regulation.

- b. An interstate agreement shall ensure that every highly automated vehicle operated within this Commonwealth under the agreement is insured or self-insured in the minimum amount as required by 75 Pa.C.S. Chapter 85 Subchapter A.

10. Hazardous Materials

- (a) **Restrictions.** A highly automated vehicle may not carry hazardous materials as defined in section 102 (relating to definitions) provided, however, that this prohibition does not apply to transporting articles and substances prepared in accordance with 49 CFR 172.315 (relating to limited quantities) or that otherwise do not require placarding pursuant to the Federal Hazardous Materials Regulations (49 C.F.R. Part 100 et seq.), unless the Certificate Holder receives certification from the department following the promulgation of regulations.

11. Definitions

The following words and terms, when used in these guidelines, have the following meanings, unless the context clearly indicates otherwise:

Accident – For purposes required for HAV, a crash involving either serious bodily injury (as defined in 18 Pa.C.S. § 2301) to or death of any person; or damage to any vehicle involved to the extent that it cannot be driven under its own power in its customary manner without further damage or Hazard to the vehicle, other traffic elements, or the trafficway, and therefore requires towing.

Applicant – A firm, copartnership, association, corporation or educational or research institution applying for a Certificate of Compliance.

Automated Driving System (ADS) – This term shall have the same meaning given that term in 75 Pa.C.S. § 102

Bodily Injury – This term shall have the same meaning given that term in 75 Pa.C.S. § 102

Certificate Holder – This term shall have the same meaning given that term in 75 Pa.C.S. § 102

Certificate of Compliance – This term shall have the same meaning given that term in 75 Pa.C.S. § 8501

Department – Pennsylvania Department of Transportation.

Developer - A firm, copartnership, association, corporation or educational or research institution who builds or develops the ADS.

Driverless Operation – The operation of a Highly Automated Vehicle without a Highly Automated Vehicle Driver on board or in a remote location.

Dynamic Driving Task (DDT) – This term shall have the same meaning given that term in 75 Pa.C.S. § 8501

Dynamic Driving Task Fallback – This term shall have the same meaning given that term in 75 Pa.C.S. § 8501

Emergency Service Responder – This term shall have the same meaning given that term in 75 Pa.C.S. § 102

Hazard – A condition, determined by the Department, where the operation of an HAV poses a danger to the HAV, infrastructure, or roadway users including, but not limited to, pedestrians, pedal cyclists, and motor vehicles.

Highly Automated Vehicle (HAV) – This term shall have the same meaning given that term in 75 Pa.C.S. § 102

Highly Automated Vehicle Driver – An individual who is an authorized employee or contractor of a Certificate Holder and who is responsible for all or part of the dynamic driving task for a highly automated vehicle and is:

- (1) on board the Highly Automated Vehicle; or
- (2) in a remote location within the United States and is capable of monitoring and controlling the Highly Automated Vehicle.

Low-speed Highly Automated Vehicle – An HAV that is in compliance with the Federal safety standards established in 49 CFR 571.500 (relating to Standard No. 500; Low-speed vehicles), including any exemptions by the National Highway Traffic Safety Administration, and designed to be operated without an occupant and used to transport goods. The term does not include a neighborhood electric vehicle.

Minimal Risk Condition – This term shall have the same meaning given that term in 75 Pa.C.S. § 8501

Municipality – For the purposes of this regulation, a city, town, borough, township of the Commonwealth.

Municipal Authority - This term shall have the same meaning given that term in 53 Pa.C.S. § 5602

Operational Design Domain (ODD) – This term shall have the same meaning given that term in 75 Pa.C.S. § 8501

Platoon – This term shall have the same meaning given that term in 75 Pa.C.S. § 8501

SAE J3016 – Surface Vehicle Recommended Practice Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles published by the Society of Automotive Engineers (SAE) International in April 2021.

Safety Associate – An individual present in the HAV to provide support, guidance, relief or other support services to the HAV Driver.

Safety Case – A structured argument, supported by a body of evidence, that provides a compelling, comprehensible, and valid case that a system is safe for a given application in a given environment.

Safety Culture – Enduring values, attitudes, motivations, and knowledge of an organization in which safety is prioritized over competing goals in decisions and behavior.

Secretary – Secretary of the Pennsylvania Department of Transportation.

Traffic-control Device – This term shall have the same meaning given in 67 Pa. Code § 212.1.

Vulnerable Road User – A non-motorist with a fatality analysis reporting system (FARS) person attribute code for pedestrian, bicyclist, other cyclist, and person on personal conveyance or an injured person that is, or is equivalent to, a pedestrian or pedalcyclist as defined in the ANSI D16.1-2007. (See 23 U.S.C. 148(a)(15) and 23 CFR 490.205)

