SLOVENSKI STANDARD
SIST EN 18166:2026

01-december-2026

Sistemi Hyperloop - Splošne zahteve

Hyperloop systems - General requirements

Hyperloop-Systeme - Allgemeine Anforderungen

Systèmes Hyperloop - Exigences générales

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ICS:

03.220.99	Druge oblike transporta	Other forms of transport
45.020	Železniška tehnika na splošno	Railway engineering in general
55.020	Pakiranje in distribucija blaga na splošno	Packaging and distribution of goods in general

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EUROPEAN STANDARD **EN 18166**

NORME EUROPÉENNE

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ICS 03.220.99; 45.020; 55.020

English version

Hyperloop systems - General requirements

Syst?es Hyperloop - Exigences g??ales

Hyperloop-Systeme - Allgemeine Anforderungen

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European foreword

This document (EN 18166:2026) has been prepared by Technical Committee CEN/CLC/JTC 20 "Hyperloop Systems", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2027, and conflicting national standards shall be withdrawn at the latest by April 2027.

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Introduction

The purpose of this document is to describe and define the high-level requirements for the hyperloop concept.

The hyperloop is a new mode of transportation for high speed ground transportation and low pressure closed environment.

These features imply to have commercial operations with passengers in conditions that never have been considered before what leads to the need of creating new standards and requirements to influence in all the stages of the development.

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1 Scope

This document provides a general view of the most relevant requirements to ensure safety, reliability, system automation, security, comfort, interoperability and operations of the hyperloop system used for the transport of passengers and goods.

This document will be the basis to set the general common requirements for the hyperloop system as a whole.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 18154, *Hyperloop Systems – Vocabulary and Definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 18154 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp/

— IEC Electropedia: available at https://www.electropedia.org/

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3.1
auxiliary system
complementary system that support operation, and maintain the safety functions in case of major failure

Note 1 to entry: These systems provide essential roles in backup, safety, maintenance, environmental control, and operational efficiency, ensuring the Hyperloop operates reliably, safely, and efficiently.

4 Tables of requirements

Table 1 provides the architecture and legend of the requirements.

Table 2 details the requirements for the Hyperloop system.

Table 3 details the requirements for the vehicle.

Table 4 details the requirements for the infrastructure.

Table 1 — Architecture and Legend

LVL (L)	system cluster (S/S)			
0	**HYPERLOOP**			
1		**Infrastructure**		
2			structure	inf_strc_sys
2			traffic management	inf_tm_sys
2			infrastructure pressure system	inf_pressure_sys
2			infrastructure emergency systems	inf_emer_sys

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LVL (L)	system cluster (S/S)			
2			infrastructure auxiliary systems	inf_aux_sys
2			infrastructure traction system	inf_traction_sys
2			facilities	
1		**Vehicle**		
2			vehicle control&communication system	vh_cntrl&comm
2			vehicle auxiliary systems	vh_auxiliary_sys
2			vehicle emergency systems	vh_emergency_sys
2			vehicle power system	vh_power_sys
2			vehicle carbody	vh_carbody_sys
2			vehicle traction system	vh_traction_sys
2				
	ReqID_name	**Funtional Block**		
	CCC	Command, Control, Communication and Signalling		
	EMER	Emergency Management		
	ENER	Energy Management		
	TRC	Traction System		
	ENV	Vehicle Internal Environment		
	MAINT	Vehicle Maintenance and Storage		
	STRC	Structure		
	LPE	Low Pressure Environment Control		
	MNTOPR	Infrastructure Maintenance (processes, functions and systems)		

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Table 2 — Hyperloop Requirements

Req_ID	Text	System block	S/S	ReqID_child_Vehicle	ReqID_child_Infrastrc
	Route Structure and Enclosure				
L0_STR_001	Provide a structural enclosure and integrity/rigidity	Infrastructure			L1_STRUCT_001 L1_STRUCT_002 L1_STRUCT_003 L1_STRUCT_004 L1_STRUCT_005 L1_STRUCT_006 L1_STRUCT_007 L1_STRUCT_008
L0_STR_002	Provide structural support to the tube / track	Infrastructure			L1_STRUCT_009 L1_STRUCT_010 L1_STRUCT_011
L0_STR_003	Enable the vehicle to change pathways	Infrastructure			L1_STRUCT_012 L1_STRUCT_013 L1_STRUCT_014 L1_STRUCT_015 L1_STRUCT_016
L0_STR_004	Enable the movement of the vehicle	Infrastructure			L1_STRUCT_017 L1_STRUCT_018
L0_STR_005	Withstand loads caused by vehicles	Infrastructure			L1_STRUCT_019 L1_STRUCT_020 L1_STRUCT_021
L0_STR_006	Withstand loads caused by the infrastructure itself	Infrastructure			L1_STRUCT_022 L1_STRUCT_023
L0_STR_007	Withstand loads due to environmental conditions	Infrastructure			L1_STRUCT_024 L1_STRUCT_025

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Req_ID	Text	System block	S/S	ReqID_child_Vehicle	ReqID_child_Infrastrc
					L1_STRUCT_026
L0_STR_008	Safekeeping of humans in or about this structure and enclosure	Infrastructure			L1_STRUCT_027 L1_STRUCT_028
L0_STR_009	Enable the evacuation of passengers	Infrastructure			L1_STRUCT_029 L1_STRUCT_030 L1_STRUCT_031 L1_STRUCT_032 L1_STRUCT_033 L1_STRUCT_034 L1_STRUCT_035 L1_STRUCT_036 L1_STRUCT_037 L1_STRUCT_038 L1_STRUCT_039
L0_STR_010	Enable the access of rescue and emergency personnel	Infrastructure			L1_STRUCT_040 L1_STRUCT_041 L1_STRUCT_042 L1_STRUCT_043
	Low Pressure Environment Control				
L0_LP_001	Reduce the pressure in the enclosed environment	Infrastructure			L1_INF_LPE_001 L1_INF_LPE_002 L1_INF_LPE_003
L0_LP_002	Increase the pressure in the enclosed environment	Infrastructure			L1_INF_LPE_004 L1_INF_LPE_005 L1_INF_LPE_006 L1_INF_LPE_007 L1_INF_LPE_008
L0_LP_003	Maintain the reduced pressure within the enclosed environment	Infrastructure			L1_INF_LPE_009 L1_INF_LPE_010

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Req_ID	Text	System block	S/S	ReqID_child_Vehicle	ReqID_child_Infrastrc
L0_LP_004	Control the pressure according to set point values	Infrastructure			L1_INF_LPE_012 L1_INF_LPE_013 L1_INF_LPE_014 L1_INF_LPE_015 L1_INF_LPE_016
	Stations and Station-Related Infrastructure				
L0_STAT_001	Allow the passengers boarding/disembarking to/from vehicle(s)	Infrastructure		L1_VH_STRC_008	L1_STAT_003 L1_STAT_004 L1_STAT_005 L1_STAT_010 L1_STAT_013 L1_STAT_011 L1_STAT_012
L0_STAT_002	Allow the cargo loading/unloading to/from vehicle(s)	Infrastructure			L1_STAT_006 L1_STAT_007
L0_STAT_003	Provide an access terminal for the cargo and passengers	Infrastructure			L1_STAT_008 L1_STAT_009
L0_STAT_004	Manage the pressure difference between the atmospheric pressure in the station and the low-pressure environment	Infrastructure			L1_STAT_001 L1_STAT_002
	Infrastructure Maintenance (processes, functions and systems)				
L0_MNT_001	Allow access into the enclosure for, including but not limited, maintenance, reparation, inspection and cleaning operations	Infrastructure			L1_INF_MNTOPR_001 L1_INF_MNTOPR_002 L1_INF_MNTOPR_003 L1_INF_MNTOPR_004 L1_INF_MNTOPR_005 L1_INF_MNTOPR_006 L1_INF_MNTOPR_007

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Req_ID	Text	System block	S/S	ReqID_child_Vehicle	ReqID_child_Infrastrc
					L1_INF_MNTOPR_008 L1_INF_MNTOPR_009
L0_MNT_002	Allow and manage the maintenance, reparation, inspection and cleaning operations of the infrastructure	Infrastructure			
L0_MNT_003	Allow the delivery and storage of new parts and materials	Infrastructure			
L0_MNT_004	Allow the disposal of old parts and materials	Infrastructure			L1_INF_MNTOPR_010 L1_INF_MNTOPR_011 L1_INF_MNTOPR_012
n/a	**Vehicle Structure**				
L0_VHSTR_001	Allow the boarding and disembarking of the passengers	vehicle		L1_VH_STRC_009 L1_VH_STRC_010 L1_VH_STRC_011 L1_VH_STRC_012	
L0_VHSTR_002	Allow the loading and unloading of the cargo	vehicle		L1_VH_STRC_013 L1_VH_STRC_014 L1_VH_STRC_015 L1_VH_STRC_016 L1_VH_STRC_017 L1_VH_STRC_031	
L0_VHSTR_003	Withstand static and dynamic forces	vehicle			
L0_VHSTR_004	Withstand pressure differentials between environments inside and outside of the vehicle	vehicle		L1_VH_STRC_029 L1_VH_STRC_030	
L0_VHSTR_005	Allow the assembly and integration of the vehicle's subsystems.	vehicle		L1_VH_STRC_001 L1_VH_STRC_002 L1_VH_STRC_003 L1_VH_STRC_004 L1_VH_STRC_005 L1_VH_STRC_006 L1_VH_STRC_007	

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Req_ID	Text	System block	S/S	ReqID_child_Vehicle	ReqID_child_Infrastrc
L0_VHSTR_006	Exhibit aerodynamic drag characteristics compliant with nominal operations	vehicle		L1_VH_STRC_018 L1_VH_STRC_019 L1_VH_STRC_020 L1_VH_STRC_021 L1_VH_STRC_022 L1_VH_STRC_023 L1_VH_STRC_024 L1_VH_STRC_025 L1_VH_STRC_026 L1_VH_STRC_027	
	Vehicle Internal Environment				
L0_VHENV_001	Provide space for passengers and/or cargo	vehicle		L1_VH_ENV_025	
L0_VHENV_002	Provide passenger's comfort	vehicle		L1_VH_CCC_024 L1_VH_CCC_025 L1_VH_ENV_016 L1_VH_ENV_017 L1_VH_ENV_018 L1_VH_ENV_019 L1_VH_ENV_020 L1_VH_ENV_021 L1_VH_ENV_022 L1_VH_ENV_023 L1_VH_ENV_024 L1_VH_ENV_026 L1_VH_ENV_027	
L0_VHENV_003	Maintain cargo's integrity	vehicle		L1_VH_ENV_008 L1_VH_ENV_009 L1_VH_ENV_010	

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Req_ID	Text	System block	S/S	ReqID_child_Vehicle	ReqID_child_Infrastrc
				L1_VH_ENV_011 L1_VH_ENV_012 L1_VH_ENV_013 L1_VH_ENV_014 L1_VH_ENV_015	
L0_VHENV_004	Provide an internal environment consistent with the required condition depending on the payload	vehicle		L1_VH_ENV_001 L1_VH_ENV_002 L1_VH_ENV_003 L1_VH_ENV_004 L1_VH_ENV_005 L1_VH_ENV_006 L1_VH_ENV_007	
n/a	**Vehicle Maintenance and Storage**				
L0_VHMNT_001	Provide access to internal and external vehicle subsystems for, including but not limited, the maintenance, inspection, reparation and cleaning operations	vehicle		L1_VH_MAINT_010 L1_VH_MAINT_011	
L0_VHMNT_002	Provide recharging of consumables when applicable	vehicle		L1_VH_MAINT_012 L1_VH_MAINT_013 L1_VH_MAINT_014 L1_VH_MAINT_015 L1_VH_MAINT_016	
L0_VHMNT_003	Transfer consumables when applicable	vehicle			
L0_VHMNT_004	Allow the maintenance, inspection, reparation and cleaning of the vehicle	vehicle		L1_VH_MAINT_007 L1_VH_MAINT_008 L1_VH_MAINT_009	L1_MAINT_004 L1_MAINT_005 L1_MAINT_006 L1_MAINT_007 L1_MAINT_008 L1_MAINT_009
L0_VHMNT_005	Allow storage of vehicles	Infrastructure			L1_MAINT_001 L1_MAINT_002

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Req_ID	Text	System block	S/S	ReqID_child_Vehicle	ReqID_child_Infrastrc
					L1_MAINT_003
L0_VHMNT_006	Allow delivery of new vehicles	Infrastructure			L1_MAINT_010 L1_MAINT_011
L0_VHMNT_007	Allow decommissioning of old vehicles	vehicle Infrastructure		L1_VH_MAINT_001 L1_VH_MAINT_002 L1_VH_MAINT_003 L1_VH_MAINT_004 L1_VH_MAINT_005 L1_VH_MAINT_006	L1_MAINT_012
	Traction System: Apply Longitudinal Forces Between Vehicle and Infrastructure				
L0_TRCL_001	Accelerate the vehicle	vehicle Infrastructure		L1_VH_TRC_001 L1_VH_TRC_002 L1_VH_TRC_003	L1_TRC_003
L0_TRCL_002	Decelerate the vehicle	vehicle Infrastructure		L1_VH_TRC_009 L1_VH_TRC_010	L1_TRC_004
L0_TRCL_003	Assert and maintain the vehicle's position and velocity on the longitudinal axis	vehicle Infrastructure		L1_VH_TRC_004 L1_VH_TRC_005 L1_VH_TRC_006 L1_VH_TRC_007 L1_VH_TRC_008	L1_TRC_001
	Traction System: Apply Transverse Forces Between Vehicle and Infrastructure				
L0_TRCT_001	Self-support the vehicle's weight	vehicle Infrastructure		L1_VH_TRC_014	L1_TRC_011
L0_TRCT_002	Assert, guide and maintain the vehicle's position on the lateral and vertical axis	vehicle Infrastructure		L1_VH_TRC_011 L1_VH_TRC_012 L1_VH_TRC_013	L1_TRC_005 L1_TRC_006

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