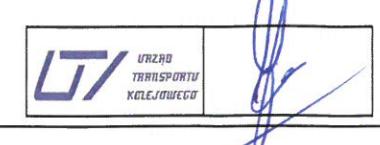
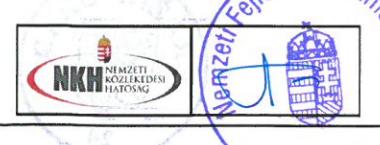
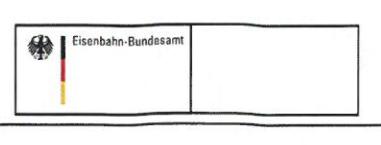


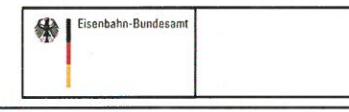
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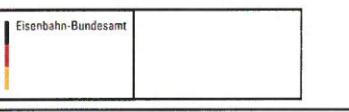
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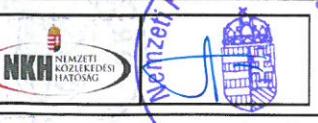
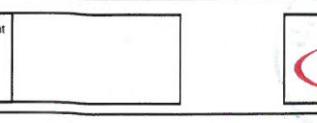
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4.4.4 Dynamic braking command	DE: B for Aktuelle Beschlussliste der Ergänzungsvorschriften on the internet		Nur dynamische Bremse (entkoppelbar) Der Höchstwert der dynamischen Bremskraft an der Zugspitze, abgegeben an den Wagenzug, beträgt 150 kN/40 tN (auch bei Mehrfachtraktion).	UIC 541-1 ERI 1177 AP1, If Section 46(1) AM-VO			UIC 541-1 UIC 541-2	Tired wheel Braking installation - electric brakes - Contribution electrical brake according to 4.2.4.1 e) - Ferromagnetic braking energy recovery http://www.eba.bund.de/cin_031/nrn_778190/SharedDocs/Publikationen/DE/Infotheke/Fahrzeuge/triebzugnahmen/VV_IBC/Achsehang/06_Bremseinrichtung.pdf;template=raw.property+publicationfile/pdf/06_Bremseinrichtung.pdf.pdf	TSI RST EN 50163:2004, 4.1	UIC 541-1 UIC 541-2 UIC 541-3 UIC 541 series	UIC 541-03 pt 1.6 UIC 541-1 UIC 541-2 UIC 541-3 UIC 541-4.3.2		UIC 544-1 UIC 544-1 UIC 544-2 UIC 544-3	UIC 544-1 UIC 544-2 UIC 544-3	
4.4.5 Parking braking command	B for missing requirements for DE			Section 46(1) AM-VO UIC 544-1 UIC 543			UIC 544-1 UIC 543		UIC 543 UIC 544-1 EN 14531-1 UIC 551 series	Article 3 For a homologation of railway vehicles apply appendix 1, where for each category of railway vehicles the corresponding requirements are specified. Brake system high capacity brake	UIC 543 UIC 544-1 PN-080177	UIC 544-1 UIC 544-1 UIC 544-1	UIC 544-1 UIC 544-1 UIC 544-1		
4.5 Brake performance								4.5 Braking installation - braking performance Minimum braking performance - Train's guaranteed braking performance and braking properties - Limit value for wheel-rail adhesion during braking See Annex...	TSI CCS Annex B TSI OPE TSI RST UIC 544-1 UIC 551-3 § 32 EBO						
4.5.1 Emergency braking	A for performance verification C for network compatibility Required braking distances should be compatible with the infrastructure.		Braking diagram (mechanical) and demonstrable mathematical determination of braking performance (braking percentages) In der Ebene (bis - 4%ko) sind für Fahrzeuge mit max. 160 km/h und ohne Zughakenzügelung mindestens 195 Bremssprozent erforderlich (Bremser R + Hg). Definition of the braking performance actually produced in accordance with UIC leaflet 544-1. The tests must also include the responses of the various safety systems (wheel side protection, Drivers' Safety Device system [Sicherheitsfahrschaltung (Sifa) etc.]. (In Anhängung § 32 EBO)	UIC 544-1 UIC 544-2 EN 14531-1 EN 14531-2 EN 15663 Section 32a EtsG			UIC 541-5 UIC 541-06 UIC 544-1	6.1.6.1 Braking installation - emergency braking Requirement relating to braking system Emergency braking triggered by the main brake valve or by an additional emergency brake valve. The emergency braking system must be able to be monitored and speed control system must have the following immediate and simultaneous effects: - a fast drop in pressure to < 2 bar in the main brake pipe. - for each wheel, a fast drop in pressure to < 2 bar in the wheel cylinder with both a brake valve for the driver as well as with an additional emergency braking control unit - an air cut-off mechanism for the refilling of the main brake pipe - a trigger for the electro-pneumatic brake (ep brake), if installed - the release of the full braking force pursuant to the output defined in 4.4.1 - an option to switch traction off. Rules and regulations and references to additional national test: "Regulations pertaining to the braking assessment of rail vehicles as a part of the approval procedure in accordance with section 32 EBO German Federal Regulation (Bundesverordnung zur Prüfung und Betriebserlaubnis von Eisenbahnen)" VDV 757: for locomotives drawn trams DIN EN 14590 Requirements to be met: (TSI EC Certificate "HS RST") + add. national	TSI RST HG section 32 EBO Haftrahmen Regelung B002 and B009	UIC 544-1 UIC 544-2 EN 14531-1 EN 14531-4 EN 15663	Regulation for inspection of railway vehicles Article 3 For a homologation of railway vehicles, as intended in article 2, apply appendix 1, where for each category of railway vehicles the corresponding requirements are specified.	UIC 540 UIC 544-1 "Koopperslag en remwerkzaamheden worden bepaald volgens UIC 544-1, derde editie, herdruk van 1 juli 1993."	UIC 544-1	UIC 544-1	UIC 544-1
4.5.2 Service braking			Braking diagram (mechanical) and demonstrable mathematical determination of braking performance (braking percentages) In der Ebene (bis - 4%ko) sind für Fahrzeuge mit max. 160 km/h und ohne Zughakenzügelung mindestens 195 Bremssprozent erforderlich (Bremser R + Hg). Definition of the braking performance actually produced in accordance with UIC leaflet 544-1. The tests must also include the responses of the various safety systems (wheel side protection, Drivers' Safety Device system [Sicherheitsfahrschaltung (Sifa) etc.]. (In Anhängung § 32 EBO)	UIC 544-3 UIC 544-2 EN 14531-1 EN 14531-2 EN 15663 Section 32a EtsG			UIC 541-3 UIC 541-4 EN 14531-1	6.1.6.2 Braking installation - service braking performance In addition to the specifications defined in the section "Minimum braking performance", trains in operation must reach the average delays defined in this clause. Full service braking (only for HS) - Definition full service braking - Switching off traction power during full service braking Rules and regulations and references to additional national test: "Braking characteristics supplemental rule Br. B007" (Adhesive use)" Requirements to be met: (TSI EC Certificate "HS RST" or EC Certificate "CCS") 6.1.6.2 Appendix 31_12_Reg_B007_Haftrahmenausnutzung_Rev2-1.pdf Braking installation - braking performance - Minimum braking performance - Train's guaranteed braking performance and braking properties - Limit value for wheel-rail adhesion during braking See Annex...	TSI RST TSI CCS Annex B TSI OPE TSI RST EN 14531-1 EN 14531-4 EN 15663 UIC 544-1 UIC 544-2 UIC 544-3 UIC 544-4 § 32 EBO Annex I	UIC 544-1 UIC 544-2 EN 14531-1 EN 14531-4 EN 15663 § 32 EBO Annex I	Regulation for inspection of railway vehicles Article 3 For a homologation of railway vehicles, as intended in article 2, apply appendix 1, where for each category of railway vehicles the corresponding requirements are specified.	UIC 540 UIC 544-1 "Koopperslag en remwerkzaamheden worden bepaald volgens UIC 544-1, derde editie, herdruk van 1 juli 1993."	UIC 544-1	UIC 544-1	UIC 544-1
4.5.3 Calculations related to thermal capacity	AT: A* - an assessment is requested for specific conditions of the network		Brake disc Temperatur- und Festigkeitsberechnung Bremsscheibe	UIC 541-3 UIC 544-1			UIC 541 series UIC 544 series	6.1.1.1 Thermal - braking behaviour on steep inclines The thermal design of the brake(s) must be such that they permit a train to operate on a line with maximum inclines (in contrast to section 4.5.5 in TSI 2006 "Infrastructure maximum speed") at a speed equaling at least 90% of the train's maximum service speed. Based on this thermal efficiency rating, the load factor must be calculated for the gradients on which the train can travel at maximum speed. Notes: - Thermal calculation (determining the temperature development at/in the braking components convert energy that for each agreed upon operation scenario) - Stop braking (two emergency brakings using a fully functioning braking system from maximum speed at the braking technology's maximum weight (EN 14590)) - Steady braking o The requirements from the problem note and the breakdown scenario (breakdown must be taken into account, if they have not yet been covered by the most unfavourably operation scenario agreed upon; Typical reference route for regional traffic in Germany is the route Aachen - Berlin. Calculation report with input variables (thermal insulation report) Requirements to be met: (TSI EC Certificate resp EC Certificate "CCS") + add. national)	TSI INF TSI RST EN 15663 UIC 541-3 UIC 544-1	UIC 541-3 UIC 544-1			UIC 541-4 UIC 544-1 (3rd edition) EN 14189 (TSI HS)	UIC 544-1	UIC 544-1
4.5.4 Parking brake			There must be a possibility of deactivating the parking brake in the event of a breakaway. Furthermore it must be ensured that tractive power can be applied even if the parking brake is engaged. It must be possible to underlay drag shoes without first disassembling any components. (Note: It is not permitted to underlay drag shoes inside the bogies.) Electrically-controlled decoupling of pulled vehicles from the driver's control panel may only be possible if at least 50 % of the parking brake force is present. In the course of the brake test, the applied and released brake positions must be recognisable beyond doubt. (Nota: towed vehicles are assumed to be locked.)	UIC 543				6.1.5 Braking installation - parking brake Safety of the train when parked in the event of a breakdown (only HS) - On an incline of 40%, a train with a normal load must still be parked for an underlay of 100% of the parking brake alone, is not enough for the purpose, in order to secure the train, additional means must be provided. - In the event of a fault in the supply of compressed air or in the event of a power outage, it must be possible to stop a train with a normal load only with the aid of the friction brake on a 40% incline and to park it for at least two hours, even if the control valve is shut off. Notes: a) secure with the total weight (as defined in DIN 2500) 1.1 times against rolling and slipping on 40% inclines while accounting for the failure of the braking force of a spring-loaded unit above the testing segment required by law. b) In addition, it must be demonstrated that the empty vehicle can be secured with 40% inclines with 1.4 times safety level when all spring-loaded units are affected. c) In addition, it must also be demonstrated up to which incline values at braking maximum weights the vehicle can be secured. (TSI EC Certificate) add. national + coherence)	EN 15663 TSI RST BSA Regulation Nr. B 004	UIC 543 UIC 543-1 UIC 543-2 EN 14531-1 EN 14531-4			UIC 543 UIC 544-1	UIC 544-1	UIC 544-1
4.6 Braking adhesion management								Additional information: http://www.eba.bund.de/cin_031/nrn_778190/SharedDocs/Publikationen/DE/Infotheke/Fahrzeuge/triebzugnahmen/VV_IBC/Achsehang/06_Bremseinrichtung.pdf;template=raw.property+publicationfile/pdf/06_Bremseinrichtung.pdf.pdf							

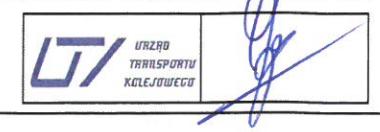
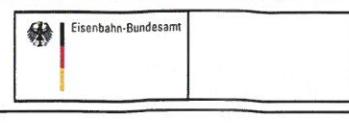


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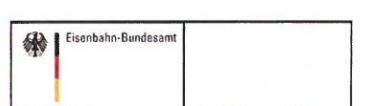
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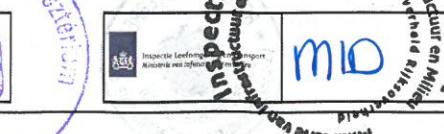
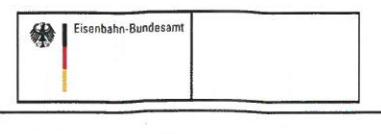
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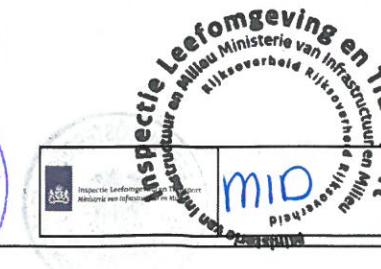
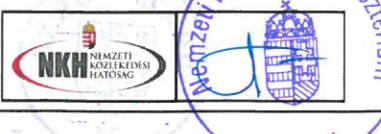
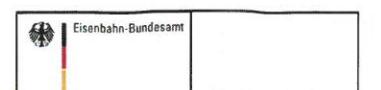


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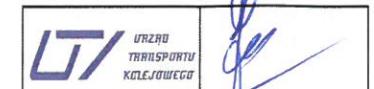
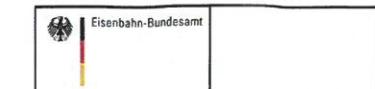


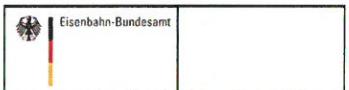


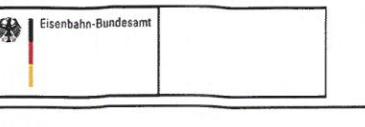


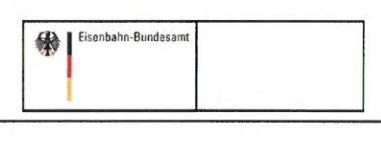
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B.2.3.7.3 Harmonic characteristics and related power-voltages on the overhead contact line				EN 50152 EN 50208	EN 50153 EN 50208			EN 50163 EN 50208	EN 50163 EN 50208		EN 50163 EN 50208	EN 50163 EN 50208
B.2.3.7.2 Effects of DC content in AC supply				No requirements	No requirements	No requirements	No requirements	No requirements	No requirements	No requirements	No requirements	No requirements
B.2.3.8 Electrical protection	E.g. selectivity of onboard protections and substation protection system (B/C: B for same power supply system, C for different one)		EN 50388 (Chapter 11) EN 50153 UIC 797 TSI Loc&Pas § 4.2.8.2.10	EN 50388 (Chapter 11) UIC 797	Additional information:	EN 50388 EN 50153 TSI Loc & PAS	EN 50388 (Chapter 11) EN 50153 TSI Loc & PAS	Overshoot in vehicle when switched off within 100 ms	EN 50388 (Chapter 11) EN 50153 EN 50214 EN 50151 EN 50229	EN 50388 (Chapter 11) EN 50153 UIC 797 TSI Loc&Pas § 4.2.8.3.6 RS CR : TSI Loc&Pas § 4.2.8.2.10 RS non-STI : et les articles Ris ou RIS	EN 50388 (Chapter 11) EN 50153 UIC 797 TSI Loc&Pas § 4.2.8.2.10	
B.2.2 Pantograph functional and design parameters												
B.2.2.1 Pantograph overall design			Geobahnheber-Auswahlbeschreibung: Nur zulässiger Stromabnehmerheber am Fahrdraht (Pantograph selection switching: only permitted pantograph type on overhead contact line) Automatische Senkeinrichtung (automatically downward mechanism)	Section 32a EbdG UIC 608 EN 50206-1 EN 5017 EN 5019 EN 50206-2 EN 50206-3 EN 50206-4 EN 50206-5 EN 50206-6 EN 50206-7 EN 50206-8 EN 50206-9 EN 50206-10 EN 50206-11 EN 50206-12 EN 50206-13 EN 50206-14 EN 50206-15 EN 50206-16 EN 50206-17 EN 50206-18 EN 50206-19 EN 50206-20 EN 50206-21 EN 50206-22 EN 50206-23 EN 50206-24 EN 50206-25 EN 50206-26 EN 50206-27 EN 50206-28 EN 50206-29 EN 50206-30 EN 50206-31 EN 50206-32 EN 50206-33 EN 50206-34 EN 50206-35 EN 50206-36 EN 50206-37 EN 50206-38 EN 50206-39 EN 50206-40 EN 50206-41 EN 50206-42 EN 50206-43 EN 50206-44 EN 50206-45 EN 50206-46 EN 50206-47 EN 50206-48 EN 50206-49 EN 50206-50 EN 50206-51 EN 50206-52 EN 50206-53 EN 50206-54 EN 50206-55 EN 50206-56 EN 50206-57 EN 50206-58 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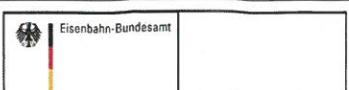
Parameter of detailed list as agreed by RISC 12/06/2009	Explanation acc. to detailed list as agreed by RISC 12/06/2009	Explanation for classification	CZ	AT	DE	HU	PL	Austria National rules	Austria Regulations, guidelines, standards	Czech Republic National rules	Czech Republic Regulations, guidelines, standards	Germany National rules	Germany Regulations, guidelines, standards	Hungary National rules	Hungary Regulations, guidelines, standards	The Netherlands National rules	The Netherlands Regulations, guidelines, standards	Poland National rules	Poland Regulations, guidelines, standards
8.2.11 Running through system separation sections	Activation des Stromabnehmers für das jeweilige österreichische Netz, Deaktivierung anderer Stromabnehmer Aktivierung der Pantographen für die respektive austriatische Netzwerk, Deaktivierung aller anderen Pantographen	PL: A for 3kV DC system, B for others	C	A	C	C	C	Activation des Stromabnehmers für das jeweilige österreichische Netz, Deaktivierung anderer Stromabnehmer Aktivierung der Pantographen für die respektive austriatische Netzwerk, Deaktivierung aller anderen Pantographen	§ 32a EtsBG	EN 50 206-1, UIC 608, UIC 611			Activation of the pantograph for the respective german network, deactivation of other pantographs Activation of the pantograph for the respective austrian network, deactivation of other pantographs	EBO	MSZ EN 50106-1 MSZ EN 50367	No NTR			No requirements
8.2.3 Contact strip functional and design parameters																			
8.2.3.1 Contact strip geometry	not a problem of vehicle gauge, this is covered by parameter, parameter refers only to working range and distance of contact strips	PL: A for B3 type of pantograph, C for others, CZ, DE, NL: A for same systems, C for others	C	A	C	C	C	Pantograph (safe current collection from the operator's network) 2 contact strips per palette, maximum distance between outside edges 650 mm	UIC 608 EN 50119 EN 50106-1 EN 50405 EN 50367 Section 32a EtsBG		EN 50206-1 EN 50405 EN 50367 UIC 608	HS RST TSI - 4.2.8.3.1, General TSILoc & PAS: 4.2.8.2.9.4.1 Contact strip geometry	HSZ EN 50106-1 HSZ EN 50405 HSZ EN 50367	UIC 608 EN 50206 EN 50367	EN 50124-1 EN 50206 EN 50367 EN 50388	EN 50124-1 EN 50206 EN 50367 EN 50388	EN 50405	EN 50405	EN 50405
8.2.3.2 Contact strip material	PL: A* for additional test for line access required by IEC	B	A	A	B	A	A	A	Solid carbon contact strips without lubrication	EN 50405 TR 940	EN 50405 EN 50367 (Carbon or metallised carbon only)	HS RST TSI - 4.2.8.3.3, Material TSILoc & PAS: 4.2.8.2.9.4.2 Carbon only Carbon only Open Point - Other material to be used on AC and/or DC lines	HSZ EN 50106-1 HSZ EN 50405	HSZ EN 50106-1 HSZ EN 50405	EN 50206 EN 50367 (carbon or metallised carbon only)	EN 50206 EN 50367 (carbon only)	EN 50405	EN 50405	EN 50405
8.2.3.3 Contact strip assessment	In accordance to TSI LocPlus this refers to a assessment related to the contact strip current density	DE: A for non-metallised carbon strip, B for others	A	A	A	A	A	Interaction of several active pantographs: For high running speeds, double traction or train with several pantographs in close proximity to each other, as well as for new designs, the specific features of the existing overhead contact lines requires tests on the ÖBB network.	EN 50206-1 EN 50119 EN 50405	EN 50206-1 EN 50405	TSILoc & PAS: 6.1.3.8 Contact strip assessment	HSZ EN 50106-1 HSZ EN 50119 HSZ EN 50405	HSZ EN 50106-1 HSZ EN 50119 HSZ EN 50405	UIC 608 EN 50206 EN 50206-1	EN 50206 EN 50206-1	EN 50206	EN 50206-1	EN 50206	
8.2.3.4 Detection of contact strip breakage			B	A	B	B	A	Automatic lowering device mandatory	EN 50206-1	EN 50206-1 EN 50405	GB TR 10 HS RST TSI - 4.2.8.3.4. Detection of contact strip breakage TSILoc & PAS: 4.2.8.2.9.10	HSZ EN 50106-1 HSZ EN 50405	HSZ EN 50106-1 HSZ EN 50405	For 1500 V/25 kV: The contact strip shall be made of carbon or of a metallized carbon, as provided for in EN 50367;	EN 50206 EN 50367	EN 50206 EN 50206-1	EN 50206	EN 50206-1	EN 50206
8.2.3.5 Current capacity	ERA to clarify the parameter (TSI reference, relation with parameter 8.2.2.6)	PL: A* for same system, additional test for line access required by IEC, B for different systems NL: A and B for the same system, C for different systems CZ: A for the same system, C for different systems	C	A	C	C	C		EN 50367 EN 50405 TR 940	EN 50367 EN 50405	EN 50206-1 EN 50405	EN 50206-1 EN 50405	EN 50206-1 EN 50405	EN 50206-1 EN 50405	EN 50206-1 EN 50405	EN 50206-1 EN 50405	EN 50206-1 EN 50405	EN 50206-1 EN 50405	EN 50206-1 EN 50405
8.3 Electrical power supply and traction system																			
8.3.1 Energy consumption measurement			A	A	A	A	A	AT - status quo: not mandatory	UIC 50463 TSI LocPas	EN 50463	EN 50463 TSI LocPas	EN 50463 TSI LocPas	EN 50463 TSI LocPas	EN 50463 TSI LocPas	EN 50463 TSI LocPas	EN 50463 TSI LocPas	EN 50463 TSI LocPas	EN 50463 TSI LocPas	EN 50463 series
8.3.2 Main electrical circuit configuration			A	A	A	A	A	Neutraleinspeisemotor - Hochspannungsprüfung ist erforderlich Prahmator Traktionsmotor Hochspannungsmischer Verriegelungsschalter der Leitungen Querschnitt durch den Lokkasten Zugherrenrichtung: Reihfeld, Drehfeld, Drehfeld Hilfsenergieversorgung	UIC 32a EtsBG UIC 510 UIC 516 UIC 519 EN 60249-1 EN 60249-2 EN 61377-1 EN 61377-2 EN 61377-3 EN 61287 EN 50349 UIC 530 UIC 532	UIC 50125-1 UIC 50163 UIC 50388 UIC 60207 UIC 60243	To be compared in point B.2.1.1 same requirements as in B.2.1.1	MSZ EN 50343	To be compared in point B.2.1.1 same requirements as in B.2.1.1	MSZ EN 50343			UIC 550 UIC 550-1 UIC 550-2 UIC 626	EN 60277 series EN 50125-1 EN 50125-2 EN 50388	EN 60277 series EN 50125-1 EN 50125-2 EN 50388 EN-E-06112 (scope the opening critical current)
8.3.3 High voltage components	AT: A* - explosion safety of measurement transformer (Oberspannungswandler) has to be proven CZ: A for same systems, B for different ones	B	A	B	B	B	A	Type test protocols Hochspannungs-Dachgeräte: Anordnung der Komponenten mit Befestigung, Komponentendaten (Maßbild, Datenblatt) für Stromabnehmer, Hauptschalter, Überstromschutzschalter, Schmelzsicherungen, Dachabzweig, Dachdurchführung Für den Überstromschutz zu nachzuweisen, dass die Isolationsfähigkeit gegeben ist. Isolationsprüfung	EN 60044-1 EN 60044-2 EN 60044-3 EN 60044-4 EN 60044-5 EN 60044-6 EN 60044-7 EN 60044-8 EN 60044-9 EN 60044-10 EN 60044-11 EN 60044-12 EN 60044-13 EN 60044-14 EN 60044-15 EN 60044-16 EN 60044-17 EN 60044-18 EN 60044-19 EN 60044-20 EN 60044-21 EN 60044-22 EN 60044-23 EN 60044-24 EN 60044-25 EN 60044-26 EN 60044-27 EN 60044-28 EN 60044-29 EN 60044-30 EN 60044-31 EN 60044-32 EN 60044-33 EN 60044-34 EN 60044-35 EN 60044-36 EN 60044-37 EN 60044-38 EN 60044-39 EN 60044-40 EN 60044-41 EN 60044-42 EN 60044-43 EN 60044-44 EN 60044-45 EN 60044-46 EN 60044-47 EN 60044-48 EN 60044-49 EN 60044-50 EN 60044-51 EN 60044-52 EN 60044-53 EN 60044-54 EN 60044-55 EN 60044-56 EN 60044-57 EN 60044-58 EN 60044-59 EN 60044-60 EN 60044-61 EN 60044-62 EN 60044-63 EN 60044-64 EN 60044-65 EN 60044-66 EN 60044-67 EN 60044-68 EN 60044-69 EN 60044-70 EN 60044-71 EN 60044-72 EN 60044-73 EN 60044-74 EN 60044-75 EN 60044-76 EN 60044-77 EN 60044-78 EN 60044-79 EN 60044-80 EN 60044-81 EN 60044-82 EN 60044-83 EN 60044-84 EN 60044-85 EN 60044-86 EN 60044-87 EN 60044-88 EN 60044-89 EN 60044-90 EN 60044-91 EN 60044-92 EN 60044-93 EN 60044-94 EN 60044-95 EN 60044-96 EN 60044-97 EN 60044-98 EN 60044-99 EN 60044-100 EN 60044-101 EN 60044-102 EN 60044-103 EN 60044-104 EN 60044-105 EN 60044-106 EN 60044-107 EN 60044-108 EN 60044-109 EN 60044-110 EN 60044-111 EN 60044-112 EN 60044-113 EN 60044-114 EN 60044-115 EN 60044-116 EN 60044-117 EN 60044-118 EN 60044-119 EN 60044-120 EN 60044-121 EN 60044-122 EN 60044-123 EN 60044-124 EN 60044-125 EN 60044-126 EN 60044-127 EN 60044-128 EN 60044-129 EN 60044-130 EN 60044-131 EN 60044-132 EN 60044-133 EN 60044-134 EN 60044-135 EN 60044-136 EN 60044-137 EN 60044-138 EN 60044-139 EN 60044-140 EN 60044-141 EN 60044-142 EN 60044-143 EN 60044-144 EN 60044-145 EN 60044-146 EN 60044-147 EN 60044-148 EN 60044-149 EN 60044-150 EN 60044-151 EN 60044-152 EN 60044-153 EN 60044-154 EN 60044-155 EN 60044-156 EN 60044-157 EN 60044-158 EN 60044-159 EN 60044-160 EN 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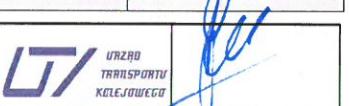
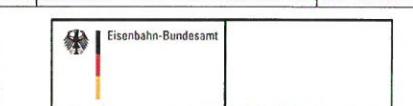






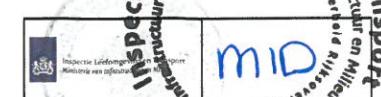
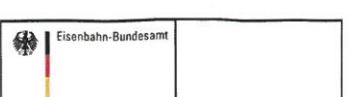






Geographical Interest Group Central Eastern-North

Annex 2 to Agreement on the multilateral recognition of the authorisation procedure for locomotives and passenger rolling stock between the national safety authorities of Austria, the Czech Republic, Germany, Poland, the Netherlands and Hungary, December 2016



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