Overview of EPB standards currently out for formal vote at CEN and ISO level

The European Commission asked CEN (mandate M480) to develop standards supporting the application of recast EPBD.

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This overview is presented to illustrate the list of EPB standards currently out for Formal Vote at CEN and ISO level[1]. For most of the standards this final voting will close before the end of January 2017. Voting takes place through the National Standard Bodies (NSB's). Formal Vote implies that NSB's can only accept or not, editorial issues may be reported but technical changes are not possible. If the standard was earlier accepted in the enquiry stage, a similar positive vote in this Formal Vote stage is expected as well. These final vote versions are based on the draft standards (the prEN's) that have been published for enquiry last year. As all comments received during the enquiry have been processed properly it is expected that the outcome of this final vote will be positive. However, it is imperative that all NSB's really cast their votes in due time!

After the positive voting outcome, the NSB's will have the task, during the first months of 2017, to publish these standards. For the CEN members, this also implies that they have to consider to withdraw the conflicting national standards.

Publishing these standards by the NSB's could just include adding a national coversheet where they have the opportunity to include some national information on the role of this standard in the national regulation. Another most important task is to consider if a National Annex A is needed in case the informative default Annex B values and choices are not expected to be applicable. These national Annexes A could be different for different applications such as new buildings and existing buildings and/or different for different building categories (functions) like residential and non-residential. It is expected that the NSB's will publish these national annexes if needed. Given the situation that it may include various stake holders reaching consensus on these values and choices, also taking into account regulator issues, it is expected to require some time to produce these national Annexes if needed.

The set of EPB Standards

To calculate the energy need and energy use of a building with its installations you need to determine:

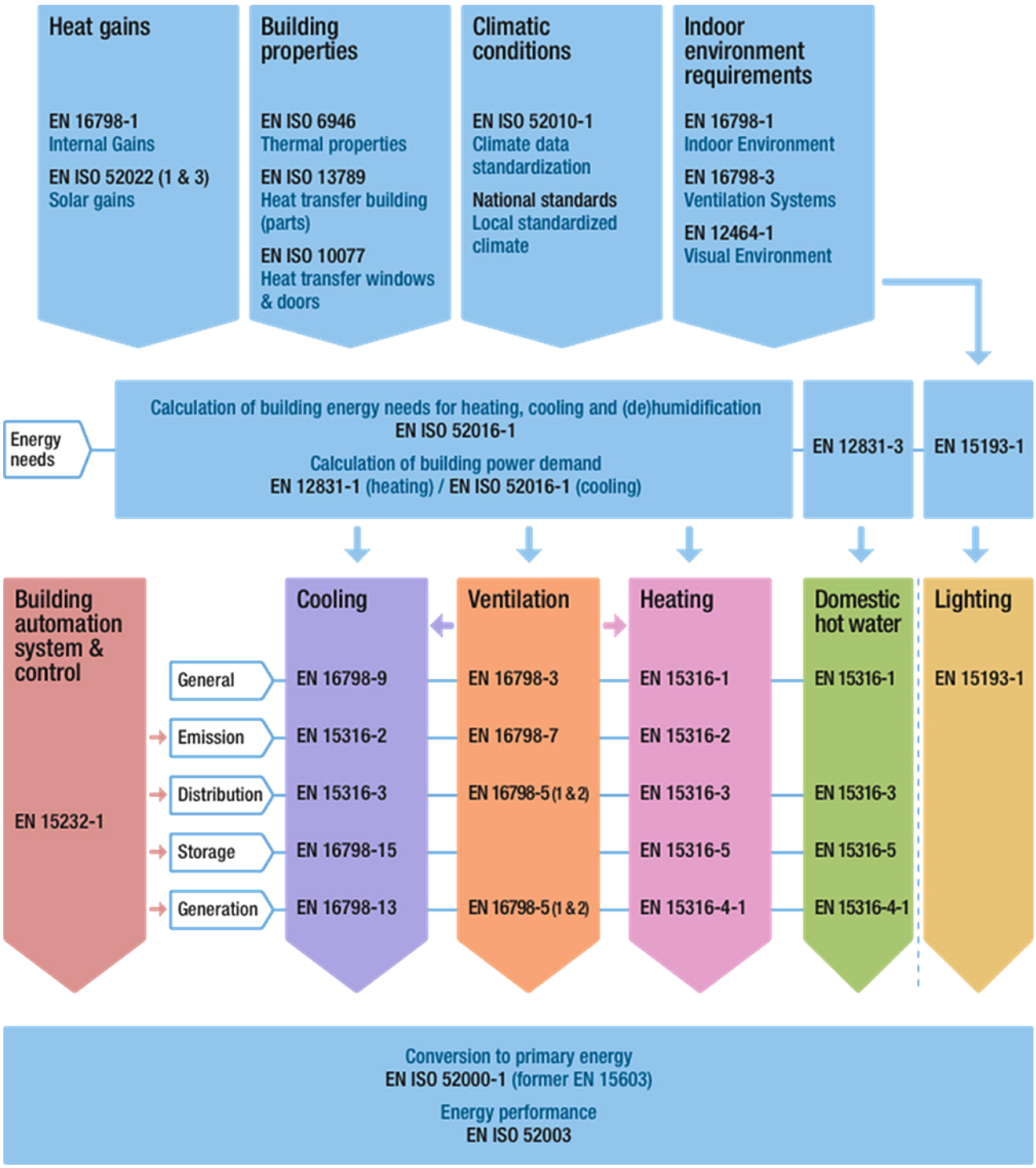
- The heat gain: how much free heat by solar and other internal gains (Plug loads, lighting etc.) is entering the building;
- Building properties: The thermal properties of the building envelope and materials of all building elements;
- External climate: the climatic data such as temperatures, humidity, solar data, location/ orientation of the building etc.;
- Indoor environment: the indoor environmental requirements (IEQ) like indoor temperatures, humidity, ventilation rate, lighting and the related assumptions for the user behaviour (schedules for presence and usages).

These input date are the basis for the energy need calculation.

To satisfy the energy needs, the building systems for heating, cooling, humidification, dehumidification, ventilation, domestic hot water and lighting have to provide these IEQ conditions in the most energy efficient way. These calculations are included in the standards related to these systems where the EPB standards related to Building Automation, Controls and Building Management play an important role in reaching the assumed set points.

[1] In this article and all articles on EPB standards in this REHVA journal we use the indication EN or EN ISO before the standard number and leave out the status indication FprEN FDIS xxxxx or FprENxxxxx for standards at Formal (Final) vote level at CEN and ISO and similar for the Technical Report CEN ISO/TR xxxxx and Fpr CEN/TR we also omitted the publication year, which is when omitted 2006.

EPB Standards supporting the implementation of the EU Energy Performance Buildings Directive (EPBD)



The overarching EPB standard

- EN ISO 52000-1 Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures EPB Standards related to Energy Need calculation

EPB Standards related to the Energy Need Calculation

- EN ISO 52022-1 Energy performance of buildings — Thermal, solar and daylight properties of building components and elements — Part 1: Simplified calculation method of the solar and daylight characteristics for solar protection devices combined with glazing
- EN ISO 6946 Building components and building elements — Thermal Resistance and thermal transmittance — Calculation methods
- EN ISO 13789 Thermal performance of buildings — Transmission and ventilation heat transfer coefficients — Calculation method
- EN ISO 10077-1 Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Part 1: General
- EN 16798-1 (expected 12 -12) Energy performance of buildings — Indoor Environmental Quality — Part 1: Indoor environmental input parameters for the design and assessment of energy performance of buildings.
- EN 16798-3 (expected 12 -12) Ventilation for non-residential buildings — Performance requirements for ventilation, air conditioning and room-conditioning systems
- EN ISO 52016-1 Energy performance of buildings — Energy needs for heating and cooling, internal temperatures and sensible and latent head loads — Part 1: Calculation procedures
- EN 12831-1 Energy performance of buildings — Method for calculation of the design heat load — Part 1: Space heating load, Module M3-3
- EN 12831-3 Energy performance of buildings — Method for calculation of the design heat load — Part 3: Domestic hot water systems heat load and characterisation of needs, Module M8-2, M8-3
- EN 15193-1 Energy performance of buildings – Energy requirements for lighting — Part 1: Specifications, Module M9
- EN ISO 52022-3 Energy performance of buildings — Thermal, solar and daylight properties of building components and elements — Part 3: Detailed calculation method of the solar and daylight characteristics for solar protection devices combined with glazing
- EN ISO 52016-1 Energy performance of buildings — Energy needs for heating and cooling, internal temperatures and sensible and latent head loads — Part 1: Calculation procedures
- EN ISO 52017-1 Energy performance of buildings — Sensible and latent heat loads and internal temperatures — Part 1: Generic calculation procedures
- EN ISO 13786-1 Thermal performance of building components — Dynamic thermal characteristics — Calculation methods
- EN ISO 52010-1 Energy performance of buildings — External climatic conditions — Part 1: Conversion of climatic data for energy calculations

EPB Standards related to Building Automation, Controls and Building Management

- EN 15232-1 Energy Performance of Buildings — Energy performance of buildings — Part 1: Impact of Building Automation, Controls and Building Management — Modules M10-4,5,6,7,8,9,10
- EN 12098-1 Energy Performance of Buildings — Controls for heating systems — Part 1: Control equipment for hot water heating systems — Modules M3-5, 6, 7, 8
- EN 12098-3 Energy Performance of Buildings — Controls for heating systems — Part 3: Control equipment for electrical heating systems — Modules M3-5,6,7,8
- EN 12098-5 Energy Performance of Buildings — Controls for heating systems — Part 5: Start-stop schedulers for heating systems — Modules M3-5,6,7,8
- EN 15500-1 Energy Performance of Buildings — Control for heating, ventilating and air conditioning applications — Part 1: Electronic individual zone control equipment — Modules M3-5, M4-5, M5-5
- EN 16946-1 Energy Performance of Buildings — Inspection of Automation, Controls and Technical Building Management — Part 1: Module M10-11
- EN 16947-1 Energy Performance of Buildings — Building Management System — Part 1: Module M10-12

EPB Standards related to Cooling

- EN 16798-5-1 Energy performance of buildings — Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8 — Ventilation for buildings — Calculation methods for energy requirements of ventilation and air conditioning systems — Part 5-1 Distribution and generation — Method 1

- EN 15316-2 Energy performance of buildings — Part 18: Ventilation for buildings — Module M4-11, M5-11, M6-11, M7-11 — Guidelines for inspection of ventilation and air conditioning systems — Technical report — Interpretation of the requirements in EN 16798-17
- EN 15316-3 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 3: Space distribution systems (DHW, heating and cooling), Module M3-6, M4-6, M8-6
- EN 16798-15 Energy performance of buildings — Part 15: Module M4-7 — Calculation of cooling systems — Storage
- EN 16798-13 Energy performance of buildings — Part 13: Module M4-8 — Calculation of cooling systems
- EN 15316-4-2 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-2: Space heating generation systems, heat pump systems, Module M3-8-2, M8-8-2
- EN 15316-4-5 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-5: District heating and cooling, Module M3-8-5, M4-8-5, M8-8-5, M11-8-5
- EN 16798-17 Energy performance of buildings — Part 17: Ventilation for buildings — Guidelines for inspection of ventilation and air conditioning systems, Module M4-11, M5-11, M6-11, M7-11

EPB Standards related to Ventilation and to Humidification and Dehumidification

- EN 16798-3 (per 2016-12-12) Energy performance of buildings — Part 3: Ventilation for non-residential buildings — Performance requirements for ventilation and room-conditioning systems
- EN 16798-7 Energy performance of buildings — Part 7: Ventilation for buildings — Modules M5-1, M5-5, M5-6, M5-8 — Calculation methods for the determination of air flow rates in buildings including infiltration
- EN 16798-5-1 Energy performance of buildings — Modules M5-6, M5-8, M6-5, M6-8, M7-5, M7-8 — Ventilation for buildings — Calculation methods for energy requirements of ventilation and air conditioning systems — Part 5-1 Distribution and generation — Method 1
- EN 16798-5-2 Energy performance of buildings — Modules M5-6,.2 M5-8 .2— Ventilation for buildings — Calculation methods for energy requirements of ventilation systems — Part 5-2: Distribution and generation (revision of EN 15241) — Method 2
- EN 15500-1 Energy Performance of Buildings — Control for heating, ventilating and air conditioning applications — Part 1: Electronic individual zone control equipment — Modules M3-5, M4-5, M5-5
- EN 16798-17 Energy performance of buildings — Part 17: Ventilation for buildings — Guidelines for inspection of ventilation and air conditioning systems, Module M4-11, M5-11, M6-11, M7-11

EPB Standards related to Heating

- EN 15316-1 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 1: General and Energy performance expression, Module M3-1, M3-4, M3-9, M8-1, M8-4
- EN 15316-2 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 2: Space emission systems (heating and cooling), Module M3-5, M4-5
- EN 15316-3 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 3: Space distribution systems (DHW, heating and cooling), Module M3-6, M4-6, M8-6
- EN 15316-5 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 5: Space heating and DHW storage systems (not cooling), M3-7, M8-7
- EN 12098-1 Energy Performance of Buildings — Controls for heating systems — Part 1: Control equipment for hot water heating systems — Modules M3-5, 6, 7, 8
- EN 15316-4-1 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-1: Space heating and DHW generation systems,
- EN 15316-4-2 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-2: Space heating generation systems, heat pump systems, Module M3-8-2, M8-8-2
- EN 15316-4-3 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-3: Heat generation systems, thermal solar and photovoltaic systems, Module M3-8-3, M8-8-3, M11-8-3
- EN 15316-4-4 Heating systems and water based cooling systems in buildings — Method for calculation of system energy requirements and

system efficiencies — Part 4-4: Heat generation systems, building-integrated cogeneration systems

- EN 15316-4-5 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-5: District heating and cooling, Module M3-8-5, M4-8-5, M8-8-5, M11-8-5
- EN 15316-4-8 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-8: Space heating generation systems, air heating and overhead radiant heating systems, including stoves (local), Module M3-8-8
- EN 15378-3 Energy performance of buildings — Heating and DHW systems in buildings — Part 3: Measured energy performance, Module M3-10, M8-10
- EN 15378-1 Energy performance of buildings — Heating systems and DHW in buildings — Part 1: Inspection of boilers, heating systems and DHW, Module M3-11, M8-11
- EN ISO 13789 Thermal performance of buildings — Transmission and ventilation heat transfer coefficients — Calculation method
- EN ISO 13370 Thermal performance of buildings — Heat transfer via the ground — Calculation methods
- EN ISO 6946 Building components and building elements — Thermal Resistance and thermal transmittance — Calculation methods
- EN ISO 10211 Thermal bridges in building construction — Heat flows and surface temperatures — Detailed calculations
- EN ISO 14683 Thermal bridges in building construction — Linear thermal transmittance — Simplified methods and default values
- EN ISO 10077-1 Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Part 1: General
- EN ISO 10077-2 “Thermal performance of windows, doors and shutters — Calculation of thermal transmittance — Part 2: Numerical method for frames”
- EN ISO 12631 Thermal performance of curtain walling — Calculation of thermal transmittance

EPB Standards related to Domestic Hot Water Systems

- EN 15316-1 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 1: General and Energy performance expression, Module M3-1, M3-4, M3-9, M8-1, M8-4
- EN 15316-3 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 3: Space distribution systems (DHW, heating and cooling), Module M3-6, M4-6, M8-6
- EN 15316-5 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 5: Space heating and DHW storage systems (not cooling), M3-7, M8-7
- EN 15316-4-1 Energy performance of buildings — Method for calculation of system energy requirements and system efficiencies — Part 4-1: Space heating and DHW generation systems, combustion systems (boilers, biomass), Module M3-8-1, M8-8-1
- See also the EPB standards on generation systems on Heat Pumps, Solar, Cogen, District Heating and Inspection.
- EN 15378-3 Energy performance of buildings — Heating and DHW systems in buildings — Part 3: Measured energy performance, Module M3-10, M8-10

EPB standard related to Lighting

- EN 15193-1 Energy performance of buildings — Energy requirements for lighting — Part 1: Specifications, Module M9

EPB Standards on expressing the Energy Performance Buildings

- EN ISO 52000-1 Energy performance of buildings — Overarching EPB assessment — Part 1: General framework and procedures
- EN ISO 52003-1 Energy performance of buildings — Indicators, requirements, ratings and certificates — Part 1: General aspects and application to the overall energy performance
- EN ISO 52018-1 Energy performance of buildings — Indicators for partial EPB requirements related to thermal energy balance and fabric features — Part 1: Overview of options
- EN 15459-1 Energy performance of buildings — Heating systems and water based cooling systems in buildings — Part 1: Economic evaluation procedure for energy systems in buildings, Module M1-14
- In Table B.1 from EN ISO TR 52000-2 the standards numbers are all included in the modular structure of the set of EPB standard.

Table B.1. Positions of EPB standards in the EPB modular structure.

Overarching			Building (as such)			Technical Building Systems		
	DESC [b]	ST [c]		DESC [b]	ST [c]		DESC [b]	H
sub1	M1		sub1	M2		sub1		M3
1	General	ISO 520001 ISO/TR 520002	1	General	--	1	General	EN 15316-1
2	Common terms and definitions; symbols, units and subscripts	ISO 520001 ISO/TR 520002	2	Building Energy Needs	ISO 520161, ISO 520171 ISO/TR 520162	2	Needs	
3	Applications	ISO 520001 ISO/TR 520002	3	(Free) Indoor Conditions without Systems	ISO 520161, ISO 520171 ISO/TR 520162	3	Maximum Load and Power	EN 12831-1
4	Ways to Express Energy Performance	ISO 520031 ISO 520032	4	Ways to Express Energy Performance	ISO 520181 ISO/TR 520182	4	Ways to Express Energy Performance	EN 15316-1
5	Building Functions and Building Boundaries	ISO 520001 ISO/TR 520002	5	Heat Transfer by Transmission	ISO 13789 ISO 13370 ISO 6946 ISO 10211 ISO 14683 ISO/TR 520192 ISO 100771 ISO 100772 ISO 12631	5	Emission & control	EN 15316-2 EN 1500 CEN/TR 15500 EN 12098-1 CEN/TR 12098-1 EN 12098-3 CEN/TR 12098-3 EN 12098-5 CEN/TR 12098-5
6	Building Occupancy and Operating Conditions	EN 16798-1 CEN/TR 16798-2 (ISO 177721, ISO/TR 177722)	6	Heat Transfer by Infiltration and Ventilation	ISO 13789	6	Distribution & control	EN 15316-3 EN 12098-1 CEN/TR 12098-1 EN 12098-3 CEN/TR 12098-3 EN 12098-5 CEN/TR 12098-5
7	Aggregation of Energy Services and Energy Carriers	ISO 520001 ISO/TR 520002	7	Internal Heat Gains	See M1-6	7	Storage & control	EN 15316-5 EN 12098-1 CEN/TR 12098-1 EN 12098-3 CEN/TR 12098-3 EN 12098-5 CEN/TR 12098-5
8	Building Zoning	ISO 520001 ISO/TR 520002	8	Solar Heat Gains	ISO 520223 ISO 520221 ISO/TR 520222	8	Generation & control	EN 12098-1 CEN/TR 12098-1 EN 12098-3 CEN/TR 12098-3 EN 12098-5 CEN/TR 12098-5 EN 15316-4-1 EN 15316-4-2 EN 15316-4-3 EN 15316-4-4 EN 15316-4-5 EN 15316-4-6 EN 15316-4-8
9	Calculated Energy Performance	ISO 520001 ISO/TR 520002	9	Building Dynamics (thermal mass)	ISO 13786	9	Load dispatching and operating conditions	
10	Measured Energy Performance	ISO 520001 ISO/TR 520002	10	Measured Energy Performance	- -	10	Measured Energy Performance	EN 15378-3
11	Inspection	- -	11	Inspection	(existing standards on IR inspection, airtightness, ...)	11	Inspection	EN 15378-1
12	Ways to Express Indoor Comfort	EN 16798-1 CEN/TR 16798-2 (ISO 177721, ISO/TR 177722)	12	--		12	BMS	
13	External Environment Conditions	ISO 520101 ISO/TR 520102						
14	Economic Calculation	EN 15459-1						

	C	V	HUM	DHUM	DHW	L	BACS	EL
	M4	M5	M6	M7	M8	M9	M10	M11
	EN 16798-9 CEN/TR 16798-10	EN 16798-3 (EN 13779 rev.) CEN/TR 16798-4	EN 16798-3 (EN 13779 rev.) CEN/TR 16798-4	EN 16798-3 (EN 13779 rev.) CEN/TR 16798-4	EN 15316-1	EN 15193-1	EN 15232 CEN/TR 15232	
					EN 12831-3	EN 15193-1	a	
	EN 16798-11 CEN/TR 16798-12				EN 12831-3			
	EN 16798-9 CEN/TR 16798-10	EN 16798-3 (EN 13779 rev.) CEN/TR 16798-4	EN 16798-3 (EN 13779 rev.) CEN/TR 16798-4	EN 16798-3 (EN 13779 rev.) CEN/TR 16798-4	EN 15316-1	EN 15193-1 CEN/TR 15193-2	EN 15232 CEN/TR 15232	
	EN 15316-2 EN 15500 CEN/TR 15500	EN 16798-7 CEN/TR 16798-8 EN 15500 CEN/TR 15500	EN 16798-5-1; EN 16798-5-2 CEN/TR 16798-6-1 CEN/TR 16798-6-2	EN 16798-5-1; EN 16798-5-2 CEN/TR 16798-6-1 CEN/TR 16798-6-2			EN 15232 CEN/TR 15232	
	EN 15316-3	EN 16798-5-1; EN 16798-5-2 CEN/TR 16798-6-1 CEN/TR 16798-6-2			EN 15316-3		EN 15232 CEN/TR 15232	
	EN 16798-15 CEN/TR 16798-16				EN 15316-5 EN 15316-4-3		EN 15232 CEN/TR 15232	
	EN 16798-13 CEN/TR 16798-14 EN 15316-4-2 EN 15316-4-5	EN 16798-5-1; EN 16798-5-2 CEN/TR 16798-6-1 CEN/TR 16798-6-2	EN 16798-5-1; EN 16798-5-2 CEN/TR 16798-6-1 CEN/TR 16798-6-2	EN 16798-5-1; EN 16798-5-2 CEN/TR 16798-6-1 CEN/TR 16798- 6-22	EN 15316-4-1 EN 15316-4-2 EN 15316-4-3 EN 15316-4-4 EN 15316-4-5 EN 15316-4-6		EN 15232 CEN/TR 15232	EN 15316-4-3 EN 15316-4-4 EN 15316-4-5 EN 15316-4-7
							EN 15232 CEN/TR 15232	
					EN 15378-3	EN 15193-1 CEN/TR 15193-2	EN 15232 CEN/TR 15232	
	EN 16798-17 CEN/TR 16798-18	EN 16798-17 CEN/TR 16798-18	EN 16798-17 CEN/TR 16798-18	EN 16798-17 CEN/TR 16798-18	EN 15378-1	EN 15193-1 CEN/TR 15193-2		

[a] ☐ The shaded modules are not applicable [b] DESC = Description [c] ST = Standard reference