Features	EN 1998:3-2005	SR EN 1998:3-2005 & NA for Romania	P100-3/2008 - Evaluation	ASCE/SEI 31-03	IEBC 2009
Performance-based assessment	**YES** ▪ State of damage in the structure - defined based on limit states ▪ Seismic hazard levels - defined based on the mean recurrence interval (MRI) and on the corresponding probabilities of exceedance EC8-3 Section 2.1	**≡ EN 1998:3-2005**	**YES** ▪ Performance objectives ▪ 3 performance levels for specified seismic hazard levels	**YES**	**YES**
Limit states	1. *Near Collapse* (NC) 2. *Significant Damage* (SD) 3. *Damage Limitation* (DL)	NA: choice of limit states to be checked: 1.*Life Safety* (≡SD renamed) 2.*Damage Limitation* (DL) Chosen for similar significance with LS for new buildings	1.*Ultimate limit state*, ULS (Life safety requirement) 2.*Serviceability limit state*, SLS (Damage limitation requirement) Note: For ordinary buildings, check for SLS is not compulsory	1. *Life Safety*, 3-C 2. *Immediate Occupancy*, 1-B	1. *Life Safety* 2. *Immediate Occupancy* 3. *Collapse Prevention*
Distinction between ductile and fragile structural elements	**YES** + *Primary seismic* and *secondary seismic* elements, according to EN 1998-1:2004 EC8-3 clause 2.2.1.6(P)	**≡ EN 1998:3-2005**	**YES**	**YES** Deformation/Force-controlled elements ("ductile" / "brittle") + *Primary seismic* and *secondary seismic* elements	**≡ ASCE/SEI 31-03 & 41-06**

Features	EN 1998:3-2005	SR EN 1998:3-2005 & NA for Romania	P100-3/2008 - Evaluation	ASCE/SEI 31-03	IEBC 2009
Distinction between force-based and deformation-based approaches	**YES**	**≡ EN 1998:3-2005**	**YES**	**YES**	**≡ ASCE/SEI 31-03 & 41-06**
Material strengths	▪ Mean values from *in situ* tests & additional sources of information, confidence factors corresponding to KL, partial safety factors of materials ▪ Nominal properties for new or added materials	**≡ EN 1998:3-2005**	**≡ EN 1998:3-2005**	Depending of the level of investigation: Tier 1 – implicit values, Tier 2 – values from tests or documentation, Tier 3 – values from tests	According to ASCE/SEI 41-06, Section 6.2
Seismic assessment methodologies	N/A	**≡ EN 1998:3-2005**	Three methodologies: - level 1 (simplified), - level 2 (ordinary buildings) - level 3 (nonlinear analysis; complex and/or important buildings)	Three-tier procedure (Tier 1, 2 & 3)	**≡ ASCE/SEI 31-03 & 41-06**
Data collection	General information and history, required input data EC8-3, Sections 3.1 & 3.2	**≡ EN 1998:3-2005**	**≡ EN 1998:3-2005**	During Tier 1 (Screening phase)	**≡ ASCE/SEI 31-03 & 41-06**
Knowledge levels	**YES** KL1 (limited), KL2 (normal), KL3 (full)	**≡ EN 1998:3-2005**	**≡ EN 1998:3-2005**	N/A	N/A
Confidence factors	CF_{KL1} = 1.35, CF_{KL2} = 1.2, CF_{KL3} = 1.0	**≡ EN 1998:3-2005**	**≡ EN 1998:3-2005**	N/A	N/A

Features	EN 1998:3-2005	SR EN 1998:3-2005 & NA for Romania	P100-3/2008 - Evaluation	ASCE/SEI 31-03	IEBC 2009
Recommended minimum requirements for different levels of inspection & testing	Percentage of elements that are checked for details: 20% / 50% / 80% * Material samples per floor: 1 / 2 / 3 * * Level of inspection & testing: Limited / Extended / Comprehensive	Checked elements: 10% / 15% / 80% * Material samples per 500 m^2 construction surface:* 2 / 4 / 6 * * Level of inspection & testing: L / E / C	Checked elements: 10% / 15% / 20% * Material samples per 1000 m^2 construction surface: 2 / 4 / 6 * * Level of inspection & testing: L / E / C	N/A	N/A
Identification of damage level	Implicit	**≡ EN 1998:3-2005**	Explicit requirements, general, as well as for different structure types	Based on checklists	**≡ ASCE/SEI 31-03 & 41-06**
Assessment type	Quantitative EC8-3, Chapter 4	**≡ EN 1998:3-2005**	Qualitative and / or quantitative	Quantitative	**≡ ASCE/SEI 31-03 & 41-06**
Qualitative assessment	Implicit (~ in the identification of KL) EC8-3, Chapter 3	**≡ EN 1998:3-2005**	Explicit (Chapter 5): load paths, redundancy, building configuration, plan/vertical irregularities, interaction with other buildings and elements, non-structural elements, diaphragms, foundations, foundation soil	Included in *Tier 1 - Screening Phase*	According to IBC, Section 1709

Features	EN 1998:3-2005	SR EN 1998:3-2005 & NA for Romania	P100-3/2008 - Evaluation	ASCE/SEI 31-03	IEBC 2009
Quantitative assessment methodologies					
Level 1	N/A	N/A	▪ Applicability: ordinary buildings (acc. to importance class) with additional conditions (height, regularity, seismicity level) / non-seismically designed buildings / as a preliminary method for more complex buildings ▪ Analysis method: LF, with S_d *(T)* – design spectrum ▪ Check ULS only	*Tier 1 Methodology – Screening phase* (compulsory) ▪ Checklists for various structure types (C, NC, N/A); identification of potential deficiencies; LS & IO performance levels ▪ Displacement-based ▪ Analysis method: LF, with $S_e(T)$ – elastic spectrum	**≡ ASCE/SEI 31-03**
Level 2	N/A	N/A	▪ For buildings to which Level 1 methodology is not applicable ▪ Displacement-based ▪ Linear analysis: LF, MRS, with $S_e(T)$ – elastic spectrum ▪ Use of displacement amplification factors	*Tier 2 Methodology – Evaluation phase* ▪ Displacement-based Analysis methods: ▪ linear: static – with $S_e(T)$ - or dynamic – response is multiplied with the displacement amplification factor ▪ URM special procedure ▪ method for nonstructural elements Requirements for structural elements are affected with ductility-dependent modification factors (*m*)	According to ASCE/SEI 31-03, but with seismic forces = 75% design code forces

Features	EN 1998:3-2005	SR EN 1998:3-2005 & NA for Romania	P100-3/2008 - Evaluation	ASCE/SEI 31-03	IEBC 2009
Level 3	N/A	N/A	▪ Applied in addition to Level 2 methodology ▪ For important / complex buildings ▪ Nonlinear (static / dynamic) analysis	*Tier 3 Methodology – Detailed Evaluation Phase* ▪ For structures that do not meet Tier 2 requirements ▪ Linear / nonlinear, static / dynamic analysis ▪ Identification of failure mechanism ▪ Use of provisions for existing / new buildings, with demand levels multiplied by 0.75	According to ASCE/SEI 31-03 Use of the elastic code spectrum multiplied by 0.75 Spectral values may be amplified by the importance factor, if this is specified by the code Nonlinear analysis methods: according to ASCE 41-06
Analysis methods	▪ LF, MSR – with $S_e(T)$; ▪ nonlinear static / dynamic analysis ▪ the q-factor approach (q=1.5 for R/C structures and q=2 for steel structures does not apply for the LS of *Near Collapse* For the LF method: ρ_{max}/ρ_{min}=2.5 (EN 1998:3-2005, Table 4.3)	**≡ EN 1998:3-2005** NA: for the LF method, ρ_{max}/ρ_{min}=3.0	▪ LF, MSR with $S_d(T)$ ▪ Nonlinear (static / dynamic) analysis	Depending on the level of investigation	According to ASCE/SEI 31-03, ASCE/SEI 41-06 and IBC, Ch. 16 Classification of building structures acc. to ASCE 7, Table 12.2-1
Assessment of building seismic risk	-	-	▪ Four seismic risk classes, **Rs I… Rs IV**	-	-

Features	EN 1998:3-2005	SR EN 1998:3-2005 & NA for Romania	P100-3/2008 - Evaluation	ASCE/SEI 31-03	IEBC 2009
Indices for establishing the seismic risk class of the building	N/A	N/A	▪ **R_1** (seismic conformation), **R_2** (state of the building), **R_3** (seismic safety of the structure) ▪ Criteria and values of the **R** indices for Level 1, 2 and 3 methodologies	-	-
Decisions for structural intervention	▪ General criteria (EC8-3, Ch. 5) ▪ Design of structural intervention: recommendations (EC8-3, Ch. 6)	**≡ EN 1998:3-2005**	Intervention is necessary if: ▪ **R_3** < 0.65 a_g for *Vrancea* seismic source ▪ **R_3** < 0.65 a_g for *Banat* seismic source (MRI = 40 years)	-	**≡ ASCE/SEI 31-03 & 41-06**
Definition of seismic hazard levels	Associated to MRI (return period - mean recurrence interval): 1. 2475 years (P_{50y}=2%) 2. 475 years (P_{50y}=10%) 3. 225 years (P_{50y}=20%)	MRI: 1. 100 years (P_{50y}=39%) 2. 475 years (P_{10y}=28%)	MRI: 1. 40 years (P_{50y}=70%) 2. 100 years (P_{50y}=40%) 3. 475 years (P_{50y}=10%) Values of peak ground acceleration, a_g, are specified, corresponding to the above MRI values	MCE (BSE-2)	BSE-1 & BSE-2 in ASCE/SEI 41-06, or seismic forces reduced to 75% as compared to those in IBC
Characterization of building performance levels	**YES** EC8-3 Section 2.1	**≡ EN 1998:3-2005**	**YES** (Annex A)	**YES** (Chapter 1)	**≡ ASCE/SEI 31-03 & 41-06**
Performance objectives			▪ *Basic Performance Objective* (perform. level: ULS, MRI: 40 years) - compulsory ▪ *Enhanced Performance Objective* – for buildings in **Rs I** and **Rs II** seismic risk classes (P100-3:2008, Annex A)	According to building performance levels and seismic hazard levels	Depending on the seismic hazard levels BSE-1 and BSE-2 in ASCE/SEI 41-06 and on the occupancy category in IBC (see IEBC, Tables 101.5.4.1 & 101.5.4.2)