Table 2: EC8 rules for detailing and dimensioning of primary columns (secondary columns as in DCL)

	DCH	DCM	DCL
Cross-section sides, h_c, $b_c \ge$	0.25m; $h_v/10$ if $\theta=P\delta/Vh>0.1$ (1)	-	
"critical region" length (1) $\ge$	$1.5h_c$, $1.5b_c$, 0.6m, $l_c/5$	h_c, b_c, 0.45m, $l_c/5$	h_c, b_c
	Longitudinal bars (L):		
ρ_{min}	1%		$0.1N_d/A_cf_{yd}$, 0.2% (0)
ρ_{max}	4%		4% (0)
$d_{bL} \ge$	8mm		
bars per side $\ge$	3		2
Spacing between restrained bars	$\le$150mm	$\le$200mm	-
distance of unrestrained bar from nearest restrained bar	$\le$150mm		
	Transverse bars (w):		
Outside critical regions:			
$d_{bw} \ge$	6mm, $d_{bL}/4$		
spacing $s_w \le$	$20d_{bL}$, h_c, b_c, 400mmm		$12d_{bL}$, $0.6h_c$, $0.6b_c$, 240mm
at lap splices, if d_{bL}>14mm: $s_w \le$	$12d_{bL}$, $0.6h_c$, $0.6b_c$, 240mm		
Within critical regions: (2)			
$d_{bw} \ge$ (3)	6mm, $0.4(f_{yd}/f_{ywd})^{1/2}d_{bL}$	6mm, $d_{bL}/4$	
$s_w \le$ (3),(4)	$6d_{bL}$, $b_o/3$, 125mm	$8d_{bL}$, $b_o/2$, 175mm	-
$\omega_{wd} \ge$ (5)	0.08	-	
$\alpha\omega_{wd} \ge$ (4),(5),(6),(7)	$30\mu_\phi^* \nu_d \varepsilon_{sy,d} b_c/b_o - 0.035$	-	
In critical region at column base:			
$\omega_{wd} \ge$	0.12	0.08	-
$\alpha\omega_{wd} \ge$ (4),(5),(6),(8),(9)	$30\mu_\phi \nu_d \varepsilon_{sy,d} b_c/b_o - 0.035$		-
Capacity design check at beam-column joints: (10)	$1.3\Sigma M_{Rb} \le \Sigma M_{Rc}$ No moment in transverse direction of column		-
Verification for M_x-M_y-N:	Truly biaxial, or uniaxial with $(M_z/0.7, N)$, $(M_y/0.7, N)$		
Axial load ratio $\nu_d=N_{Ed}/A_cf_{cd}$	≤ 0.55	≤ 0.65	-
	Shear design:		
V_{Ed} seismic (11)	$1.3\frac{\sum M_{Rc}^{ends}}{l_{cl}}$ (11)	$1.1\frac{\sum M_{Rc}^{ends}}{l_{cl}}$ (11)	From the analysis for the "seismic design situation"
$V_{Rd,max}$ seismic (12), (13)	As in EC2: $V_{Rd,max}=0.3(1-f_{ck}(MPa)/250)b_{wo}zf_{cd}\sin 2\delta$, with $1 \le \cot\delta \le 2.5$		
$V_{Rd,s}$ seismic (12), (13), (14)	As in EC2: $V_{Rd,s}=b_w z \rho_w f_{ywd}\cot\delta + N_{Ed}(h-x)/l_{cl}$ (13) with $1 \le \cot\delta \le 2.5$		

(0) Note (0) of Table 1 applies.

(1) h_v is the distance of the inflection point to the column end further away, for bending within a plane parallel to the side of interest; l_c is the column clear length.

(2) For DCM: If a value of q not greater than 2 is used for the design, the transverse reinforcement in critical regions of columns with axial load ratio ν_d not greater than 0.2 may just follow the rules applying to DCL columns.

(3) For DCH: In the two lower storeys of the building, the requirements on d_{bw}, s_w apply over a distance from the end section not less than 1.5 times the critical region length.

(4) Index c denotes the full concrete section and index o the confined core to the centreline of the hoops; $b_o$is the smaller side of this core.

(5) ω_{wd} is the ratio of the volume of confining hoops to that of the confined core to the centreline of the hoops, times f_{yd}/f_{cd}.

(6) α is the "confinement effectiveness" factor, computed as $\alpha = \alpha_s\alpha_n$; where: $\alpha_s = (1-s/2b_o)(1-s/2h_o)$ for hoops and $\alpha_s = (1-s/2b_o)$ for spirals; $\alpha_n = 1$ for circular hoops and $\alpha_n=1-\{b_o/((n_h-1)h_o)+h_o/((n_b-1)b_o)\}/3$ for rectangular hoops with n_b legs parallel to the side of the core with length b_o and n_h legs parallel to the one with length h_o.

(7) For DCH: at column ends protected from plastic hinging through the capacity design check at beam-column joints, $\mu_\phi^*$is the value of the curvature ductility factor that corresponds to 2/3 of the basic value,

q_o, of the behaviour factor used in the design; at the ends of columns where plastic hinging is not prevented because of the exemptions listed in Note (10) below, μ_ϕ^* is taken equal to μ_ϕ defined in Note (1) of Table 1 (see also Note (9) below); $\varepsilon_{sy,d}= f_{yd}/E_s$.

(8) Note (1) of Table 1 applies.

(9) For DCH: The requirement applies also in the critical regions at the ends of columns where plastic hinging is not prevented, because of the waivers listed in Note (10) below.

(10) The capacity design check does not need to be fulfilled at beam-column joints: (a) of the top floor, (b) of the ground storey in two-storey buildings with axial load ratio ν_d not greater than 0.3 in all columns, (c) if shear walls resist at least 50% of the base shear parallel to the plane of the frame (wall buildings or wall-equivalent dual buildings), and (d) in one-out-of-four columns of plane frames with columns of similar size.

(11) At a member end where the moment capacities around the joint satisfy: $\Sigma M_{Rb}<\Sigma M_{Rc}$, M_{Rc} is replaced by $M_{Rc}(\Sigma M_{Rb}/\Sigma M_{Rc})$.

(12) z is the internal lever arm, taken equal to 0.9d or to the distance between the tension and the compression reinforcement, $d-d_1$.

(13) The axial load, N_{Ed}, and its normalized value, ν_d, are taken with their most unfavourable value in the seismic design situation for the shear verification (considering both the demand, V_{Ed}, and the capacity, V_{Rd}).

(14) x is the compression zone depth at the end section in the ULS of bending with axial load.