Lap Length Chart as per IS 456:2000

Tension and compression lap lengths for deformed bars, 8–32 mm · Fe415 / Fe500 · M20–M30

IS 456 RULE (CL. 26.2.5.1)

Ld = 0.87 · fy · φ / (4 · τbd)

Flexural tension lap = Ld or 30φ, whichever is greater

Compression lap = Ld in compression, not less than 24φ

Direct tension lap = 2Ld or 30φ, whichever is greater

τbd for deformed bars = Table 23 value × 1.6; in compression × 1.25 more

DESIGN BOND STRESS τbd (N/MM²)

Grade	Plain (Table 23)	Deformed (×1.6)
M20	1.2	1.92
M25	1.4	2.24
M30	1.5	2.40

σs = 0.87 fy: 361 N/mm² (Fe415), 435 N/mm² (Fe500)

1. Tension lap length

mm (feet) · beams, slabs, footings, columns in flexural tension · max(Ld, 30φ)

Bar Ø	Fe500 M20	Fe500 M25	Fe500 M30	Fe415 M20	Fe415 M25
8 mm	455 1.49 ft	390 1.28 ft	365 1.20 ft	380 1.25 ft	325 1.07 ft
10 mm	570 1.87 ft	490 1.61 ft	455 1.49 ft	475 1.56 ft	405 1.33 ft
12 mm	680 2.23 ft	585 1.92 ft	545 1.79 ft	565 1.85 ft	485 1.59 ft
16 mm	910 2.99 ft	780 2.56 ft	725 2.38 ft	755 2.48 ft	645 2.12 ft
20 mm	1135 3.72 ft	975 3.20 ft	910 2.99 ft	945 3.10 ft	810 2.66 ft
25 mm	1420 4.66 ft	1215 3.99 ft	1135 3.72 ft	1180 3.87 ft	1010 3.31 ft
32 mm	1815 5.95 ft	1555 5.10 ft	1450 4.76 ft	1505 4.94 ft	1290 4.23 ft
≈ multiple	56.6φ	48.5φ	45.3φ	47.0φ	40.3φ

2. Compression lap length

mm (feet) · column bars, compression zones · max(Ld,c, 24φ)

Bar Ø	Fe500 M20	Fe500 M25	Fe415 M20	Fe415 M25
8 mm	365 1.20 ft	315 1.03 ft	305 1.00 ft	260 0.85 ft
10 mm	455 1.49 ft	390 1.28 ft	380 1.25 ft	325 1.07 ft
12 mm	545 1.79 ft	470 1.54 ft	455 1.49 ft	390 1.28 ft
16 mm	725 2.38 ft	625 2.05 ft	605 1.98 ft	520 1.71 ft
20 mm	910 2.99 ft	780 2.56 ft	755 2.48 ft	645 2.12 ft
25 mm	1135 3.72 ft	975 3.20 ft	945 3.10 ft	810 2.66 ft
32 mm	1450 4.76 ft	1245 4.08 ft	1205 3.95 ft	1035 3.40 ft
≈ multiple	45.3φ	38.8φ	37.6φ	32.2φ

HOW TO USE THIS CHART

- Values are rounded **up** to the next 5 mm. Round up again to a convenient site length if needed.
- Use the column for your steel grade and concrete grade. Higher concrete grade → shorter lap.
- Do not lap bars larger than 36 mm (Cl. 26.2.5.1a); use couplers or welding.
- Laps count as staggered when centre-to-centre distance is at least 1.3 × lap length.

NOT COVERED HERE: ADD EXTRA LENGTH

- Members in direct tension (tie beams, tension piles): 2Ld.
- Bundled bars in contact: increase the individual-bar lap.
- Seismic zones III–V: follow IS 13920 lap location and confinement rules.
- The 40d / 24d site thumb rules are acceptable only where they are not less than these values — for Fe500 in M20 they are not.

For guidance only. Check final lap lengths against the structural drawings and your structural engineer's specification. Prepared by TheCivilStudies, November 2026.