CBR test interpretation

Sheet : CBR Group-Sheets N°=1-

1. Test identification

- **Standard :** NF P 94-078
- **Test type :** Immediate bearing index (IPI)
- **Unit system :** International (SI)
- **Number of specimens :** 4

2. Measured CBR values

Specimen	Water content (%)	γd (kN/m³)	CBR (%)
CBR N°=4	6,0	17,90	12,0
CBR N°=1	9,0	18,90	**20,0**
CBR N°=2	13,0	17,80	9,0
CBR N°=3	20,0	14,50	3,0

- **Range of measured values :** 3,0 % – 20,0 %

3. Maximum measured CBR of the series

- **Maximum CBR : 20,0 %** (CBR N°=1)
- **Obtained at :** w* = 9,0 %
- **γd* :** 18,90 (kN/m³)
- These conditions (w*, γd*) are those of the best specimen tested; iso-CBR curves (Annex A, NF P 94-078) require a full study (3 energies × 5 water contents).

4. Water sensitivity (from the tests)

- Over the tested water content range (w = 6,0 % – 20,0 %), the CBR varies from 3,0 % to 20,0 %, i.e. a max/min ratio of 6,7.
- γd also varies from 14,50 to 18,90 (kN/m³) (23 %): the CBR variation combines the effects of water content and density.
- Specimens wetter than the optimum show lower bearing — the wet-side drop is visible in the data.
- The CBR index is not an intrinsic soil property: its value is only meaningful when tied to the specimen state characteristics (water content, dry density, saturation state).

> Immediate index (no soaking): the bearing rating and modulus correlations, established for soaked CBR, are not applied.

5. Verification

- **Project requirement :** CBR ≥ 25,0 %
- **Specimens satisfying the requirement :** none → **not satisfied**

6. Notes and references

- Immediate CBR and IPI are measured at the moulding water content; the CBR after immersion (4 days) represents unfavourable water conditions.
- Design CBR index (Annex A, NF P 94-078) — For design, the CBR index used must correspond to the water content and density state actually expected in service; a CBR study (3 energies × 5 water contents, iso-CBR curves) determines it.
- Water sensitivity should be assessed with the Atterberg limits and the GTR hydric state.
- NF P 94-078 applies to soils and materials whose proportion of elements > 20 mm does not exceed 30%.
- NF P 94-078 ; NF P 94-093 ; NF P 11-300

• Heukelom & Klomp (1962) ; Powell et al. (1984) ; AASHTO Guide (1993) ; NCHRP (2001) ; Katte et al. (2018)