

## **FAMILY OF CURVES – ONE-POINT METHOD FOP FOR AASHTO T 272 (11)**

### **Scope**

This procedure provides for a rapid determination of the maximum density and optimum moisture content of a soil sample, utilizing a family of curves and a one-point determination in accordance with AASHTO T 272. This procedure is related to the FOP for AASHTO T 99/T 180.

One-point determinations are made by compacting the soil in a mold of a given size with a specified rammer dropped from a specified height. Four alternate methods – A, B, C, and D – are used and correspond to the methods described in the FOP for AASHTO T 99/T 180. The method used in AASHTO T 272 must match the method used in the FOP for AASHTO T 99/T 180.

### **Apparatus**

See the FOP for AASHTO T 99/T 180.

### **Sample**

Sample size determined according to the FOP for AASHTO T 310. In cases where the existing family cannot be used a completely new curve will need to be developed and the sample size will be determined by the FOP for AASHTO T 99/T 180.

### **Procedure**

See the FOP for AASHTO T 99/T 180.

### **Calculations**

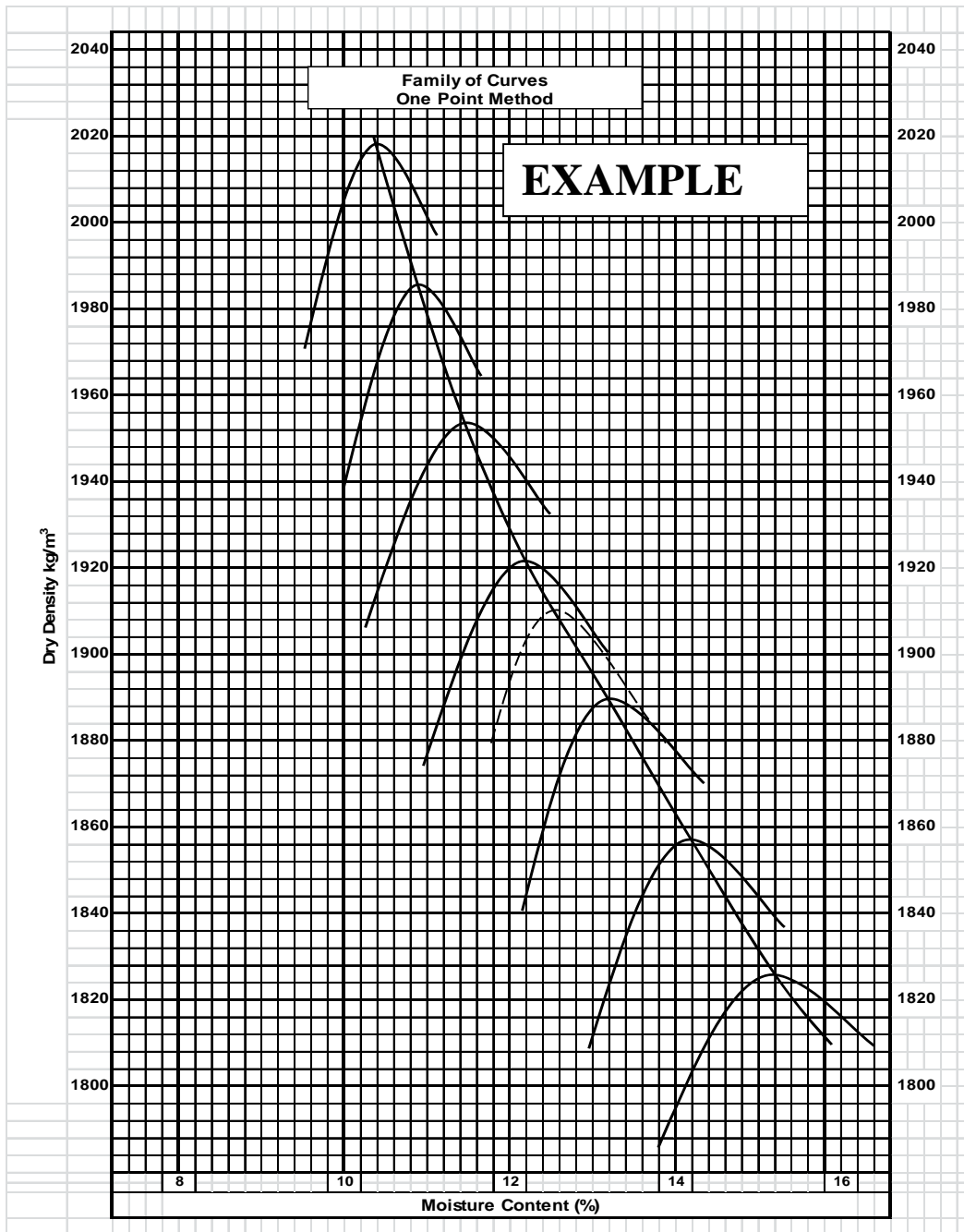
See the FOP for AASHTO T 99/T 180.

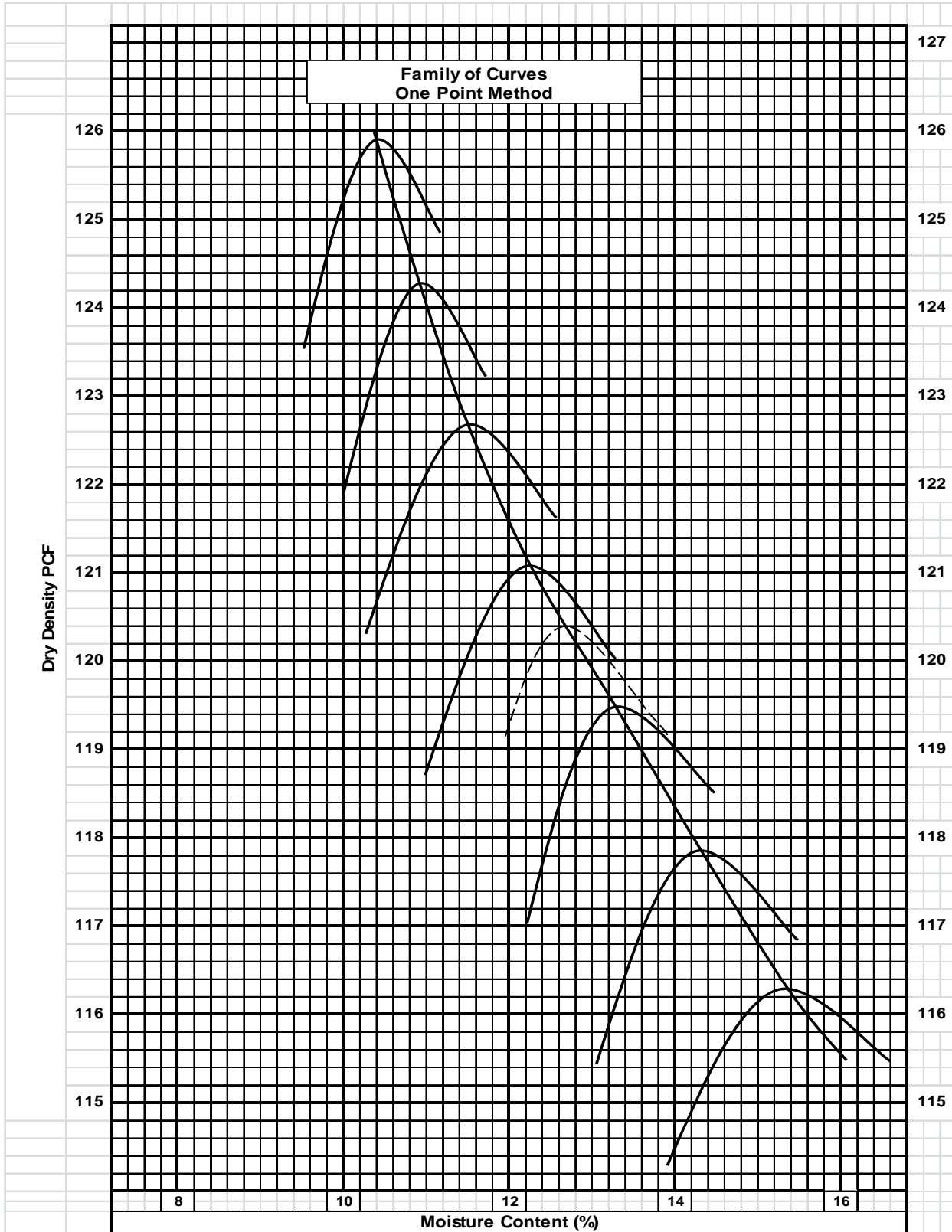
### **Maximum Dry Density and Optimum Moisture Content Determination**

1. If the moisture-density one-point falls on one of the curves in the existing family of curves, the maximum dry density and optimum moisture content defined by that curve shall be used.
2. If the moisture-density one-point falls within the family of curves but not on an existing curve, a new curve shall be drawn through the plotted single point, parallel and in character with the nearest existing curve in the family of curves. The maximum dry density and optimum moisture content as defined by the new curve shall be used.
3. The one-point must fall either between or on the highest or lowest curves in the family. If it does not, then a full curve must be developed.

4. If the one-point plotted within or on the family of curves does not fall in the 80 to 100 percent of optimum moisture content, compact another specimen, using the same material, at an adjusted moisture content that will place the one point within this range.
5. If the family of curves is such that the new curve through a one-point is not well defined or is in any way questionable, a full moisture-density relationship shall be made for the soil to correctly define the new curve and verify the applicability of the family of curves.

**Note 1:** New curves drawn through plotted single point determinations shall not become a permanent part of the family of curves until verified by a full moisture-density procedure following the FOP for AASHTO T 99/T 180.





### **Example**

A moisture-density procedure (FOP for AASHTO T 99/T 180) was run. A dry density of  $1885 \text{ kg/m}^3$  and a corresponding moisture content of 11.5 percent or  $119.1 \text{ lb/ft}^3$  at 11.9 percent were determined. This point was plotted on the appropriate family between two previously developed curves.

The “dashed” curve beginning at the moisture-density one-point was sketched between the two existing curves. A maximum dry density of  $1915 \text{ kg/m}^3$  and a corresponding optimum moisture content of 12.4 percent or  $120.4 \text{ lb/ft}^3$  and 12.7 percent moisture were estimated.

### **Report**

Results shall be reported on standard forms approved by the agency. Report maximum dry density to the closest  $1 \text{ kg/m}^3$  ( $0.1 \text{ lb/ft}^3$ ) and optimum moisture content to the closest 0.1 percent.



