12¼ or 12½ – 2 units of 14 pt. .0215

Just

Calculation of Unit Sizes

In making special Matrix Case Arrangements it is often desirable to know the value, in thousandths of an inch, of different units of different sets. While the Table of Type Sizes, shows these at a glance, the method of figuring this table will be of interest. This table also gives, at the top, the size in thousandths of an inch of the different point-size bodies from five-to twelve-point inclusive.

The set-size of any eighteen-unit character in any twelve-set font is one pica (12 points); that is, .166″. If it were possible to make a one-set face, the eighteen-unit characters of this one-set face would be one-twelfth as wide as the eighteen-unit characters of twelve-set, thus:

$.166'' \div 12 =$ eighteen units of one-set, which may be expressed thus:

$$\frac{.166''}{12}$$

One-unit-of-one-set would be one-eighteenth of this size (18 units of 1-set), or

$$.166'' \div 18 = \frac{.166''}{12 \times 18} = \frac{.166''}{216} = .0007685'', \text{ one-unit-of-one-set}$$

Knowing the size of one-unit-of-one-set, to find the size of one unit of any set multiply the value of one-unit-of-one-set (.0007685″) by the set desired; to find the size of any number of units of this set multiply this product (1 unit of its set) by the required number of units.

Rule: To find the size, in thousandths of an inch, of any number of units of any set multiply the product of these two (set and units) by .0007685″.

Examples:

(a) Find the size of nine units of eight-set.

9x8 = 72
.0007685″x72 = .0553320″
Nine units of eight-set = .0553″

.0007685″
72
15370
53795
.0553320″

(b) Find the size of six units of twelve-set.

6x12 72
.0007685″x72 = .0553320″
Six units of twelve-set = .0553″

See (a) above for multiplication of one-unit-of-one-set by 72

It will be noted that (a) and (b) both equal the same amount (.0553″)because in both cases the product of set and units equals the same amount (72). Thus:

9x8 = 72 and 6x12 = 72

Rule: Any two characters are of the same set-size (have the same width bodies) if the number of units in one, multiplied by its set, equals the number of units in the other, multiplied by its set. Therefore any Matrix may be inserted in a Matrix Case provided the set factor of the new Matrix equals, or is less than, the set factor of the Matrix replaced.

Set Factor: The set of the font to which any character belongs, multiplied by the unit-row in which it is carried, is called the set factor of the character.

If the set factors be equal, the new character will be cast on exactly the size body for which it was designed. If the new character's set factor be less, the Mold opening will be greater than when this character is cast on its proper body, and therefore the type will be cast with a shoulder to the left of the character on the type-body itself; that is, to the left of the character in print. The size of this shoulder equals the difference in set factors multiplied by one-unit-of-one-set (.0007685″). In many cases this shoulder is not in the least objectionable, and in some special work (to bear away from a rule, for example) it is an advantage.

NOTE: As the operator faces the Caster, the nicks in the type are toward his right hand, and any shoulder added to the type-body is cast on the side that, in this position, is furthest from him (toward the back of the machine). This is called the left side of the type because, as the compositor sets type in his stick, the nick is furthest from him, and the side to which a shoulder may be added by the Casting Machine is, therefore, toward the compositor's left.

If the Set Factor of the new character be greater than the Set Factor of the character it replaces, the mold blade will not be pulled back far enough and the character would be cast with a kern to the left of its type-body. This, of course, is not permissible, since this kern to the left would interfere with the character next to it.

Rule: Given the Set Factor of a Matrix, to determine for any set the unit-row of the Matrix Case in which to carry this Matrix, divide this Set Factor by the set to be used; the result is the unit-row required. If the result of this division contains a fraction, use the next larger unit-row.

Example: The Set Factor of a Matrix is 80: in what row of a nine-set Matrix Case must this Matrix be carried?

$$80 \div 9 = 8.8$$

Therefore put the Matrix in the nine-unit row.

Summary: In view of the importance of the material up to this point, the student should not go further until all of the previous information is clearly understood.

First: The Matrices on the same comb in the Matrix Case produce characters of the same set-size.

Second: The width of the characters produced by Matrices on the same comb bears a fixed ratio to the widest characters in the Matrix Case; that is, those produced by the Matrices on the right-hand comb when facing the case in operating position.

Third: If the widest character of a font be divided into eighteen equal parts, or units, the unit values of the combs of the Matrix Case from left to right (operating position) are: 5 6 7 8 9 9 9 10 10 11 12 13 14 15 18. All standard faces are designed for this arrangement of unit-rows; for special work this may be altered by a simple change of the Keyboard and a special normal wedge.

Fourth: The actual size of these units depends upon the set of the face in use.

Fifth: The set of a face indicates whether it is condensed or extended and is expressed by the width in points (and fractions of a point, if necessary) of the widest (18-unit) characters of the face.

Sixth: While set is thus expressed in points, there is no relation whatever between set-size and point-size. Set expresses the width of the letter (linewise); point expresses the depth (column-wise).