# ГОСТ 9066-75 Шпильки для фланцевых соединений с температурой среды от 0 °С до 650 °С. Типы и основные размеры (с Изменениями N 1, 2)

ГОСТ 9066-75  
  
Группа Г18

МЕЖГОСУДАРСТВЕННЫЙ СТАНДАРТ  
  
  
ШПИЛЬКИ ДЛЯ ФЛАНЦЕВЫХ СОЕДИНЕНИЙ С ТЕМПЕРАТУРОЙ СРЕДЫ ОТ 0 °С ДО 650 °С  
  
Типы и основные размеры  
  
Studs for flanged connections with medium temperature from 0 °С to 650 °С. Typеs and main dimensions

МКС 23.040.60

Дата введения 1976-01-01

Постановлением Государственного комитета стандартов Совета Министров СССР от 28 марта 1975 г. N 794 дата введения установлена 01.01.76       
       
     Ограничение срока действия снято по протоколу N 5-94 Межгосударственного совета по стандартизации, метрологии и сертификации (ИУС 11-12-94)  
             
     ВЗАМЕН ГОСТ 9066-69  
       
     ИЗДАНИЕ (ноябрь 2003 г.) с Изменениями N 1, 2, утвержденными в июне 1980 г., декабре 1985 г. (ИУС N 9-80, 4-8).  
       
       
     

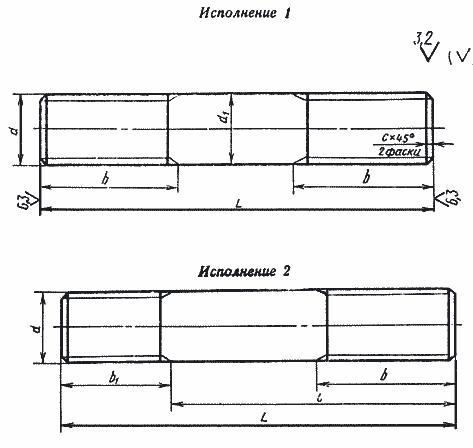
1. Настоящий стандарт распространяется на шпильки односторонние и двусторонние для фланцевых соединений паровых и газовых турбин, паровых котлов, трубопроводов и соединительных частей, арматуры, приборов, аппаратов и резервуаров с температурой среды от 0 °С до 650 °С.  
       
     Стандарт не распространяется на фланцевые соединения объектов, подведомственных Госгортехнадзору СССР, с условным давлением  менее 4 МПа (40 кгс/см).  
       
     (Измененная редакция, Изм. N 1).

2. Шпильки должны изготовляться следующих типов:  
       
     А - шпилька сплошная с одинаковыми номинальными диаметрами резьбы и гладкой части, применяемая для фланцевых соединений трубопроводов паровых котлов, паровых и газовых турбин, арматуры, приборов и резервуаров с температурой металла менее или равной 300 °С;  
       
     Б - шпилька сплошная с номинальными диаметрами резьбы, большими номинального диаметра гладкой части, применяемая для фланцевых соединений турбин, трубопроводов и соединительных частей паровых котлов, паровых и газовых турбин, арматуры, приборов, аппаратов и резервуаров с температурой металла свыше 300 °С;  
       
     В - шпилька с осевым отверстием по всей длине, с номинальными диаметрами резьбы, большими номинального диаметра гладкой части, и выступом четырехгранным "под ключ", затягиваемая с нагревом, применяемая для разъемов корпусов цилиндров паровых и газовых турбин, стопорных и регулирующих клапанов с контролируемым затягом шпильки и температурой металла от 0 °С до 650 °С;  
       
     Г - шпилька с осевым отверстием по всей длине, с номинальными диаметрами резьбы, большими номинального диаметра гладкой части, и цилиндрическим выступом на ввинчиваемом конце, затягиваемая с нагревом, применяемая для разъемов корпусов цилиндров паровых и газовых турбин, стопорных и регулирующих клапанов, арматуры с контролируемым затягом шпильки и температурой металла от 0 °С до 650 °С;  
       
     Д - шпилька с осевым отверстием по всей длине, с номинальными диаметрами резьбы, большими номинального диаметра гладкой части, затягиваемая с нагревом, применяемая для разъемов корпусов цилиндров паровых и газовых турбин, трубопроводов и соединительных частей, арматуры, стопорных и регулирующих клапанов с контролируемым затягом шпильки и температурой металла от 0 °С до 650 °С.

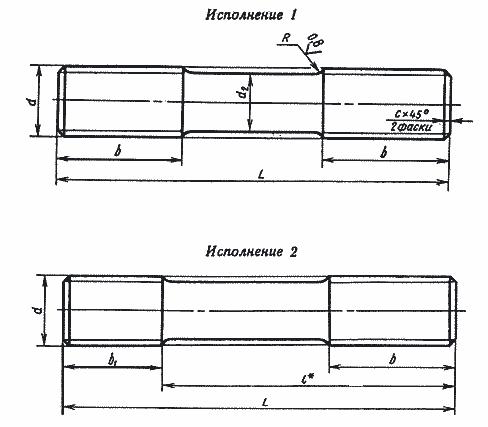
3. Размеры шпилек должны соответствовать указанным на черт.1-3 и в табл.1, 2.  
     

### Черт. 1. Тип А; Тип Б

**Тип А**



**Тип Б**

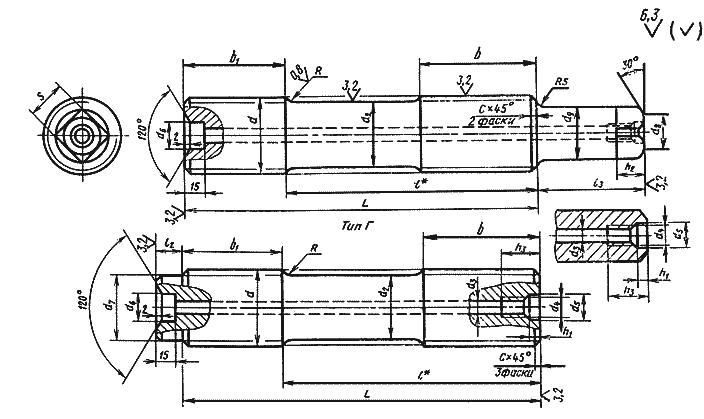


Черт.1

\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
     \* Размер для справки.  
     

### Черт. 2. Тип В

**Тип В**

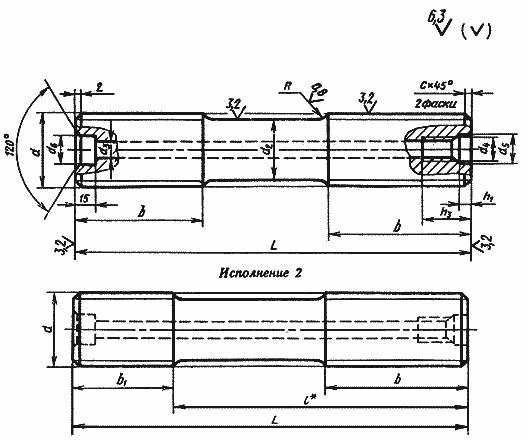
[](http://docs.cntd.ru/picture/get?id=P001A&doc_id=1200004983)

Черт.2

\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
     \* Размер для справки.

### Черт. 3. Тип Д

**Тип Д**  
  
Исполнение 1



Черт.3

\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
     \* Размер для справки.

Таблица 1

мм

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Номинальный диаметр резьбы | | | | 10 | 12 | 16 | 20 | (22) | 24 | (27) | | 30 | 36 | | 42 | 48 | (52) | 56 | | (60) |
| Шаг резьбы | | крупный | | 1,5 | 1,75 | 2 | 2,5 | | 3 | | | 3,5 | 4 | | 4,5 | 5 | | 5,5 | | |
|  | | мелкий | | 1,25 | | 1,5 | | | 2 | | | | 3 | | | | | 4 | | |
| Диаметр гладкой части | для шпилек типа А |  | | По ГОСТ 19258-73 и ГОСТ 19256-73 | | | | | | | | | | | | | | | | |
|  | для шпилек типов Б, В, Г, Д | 12 | с крупным шагом | 7,8 | 9,5 | 13 | 16 | 18 | 20 | 22 | | 24 | 30 | | 35 | 40 | 44 | 48 | | 52 |
|  |  |  | с мелким шагом | 8 |  | 14 | 18 | 20 | 21 | 24 | | 27 | 33 | | 35 |  | 44 | 50 | | 54 |
|  |  |  |  | - | | | | | | | | | | | | | | | | |
| Диаметр осевого отверстия  для шпилек типов В, Г, Д | | | | - | | | | | | | | 10 | | | | | | | | |
| Диаметр резьбы осевого отверстия  для шпилек типов В, Г, Д | | | | - | | | | | | | | М12 | | | | | | | | |
| Диаметр расточки осевого отверстия для шпилек типов В, Г, Д | |  | | - | | | | | | | | 13 | 17 | | | | | | | |
|  | |  | | - | | | | | | | | | | | | | | | | |
| Диаметр цилиндрического выступа  для шпилек типа Г | | | | - | | | | | | | | 24 | | 30 | 34 | 39 | 43 | | 48 | 52 |
| Диаметр вписанной окружности  для шпилек типа В | | | | - | | | | | | | | 14 | | 20 | | | 25 | | | 30 |
| Диаметр описанной окружности  для шпилек типа В | | | | - | | | | | | | | 20 | | 30 | | | 34 | | | 40 |
| Радиус перехода  для шпилек типов Б, В, Г, Д | | | | 6 | | | | 8 | | | | | | 12 | | | | | | |
| Глубина расточки осевого отверстия  для шпилек типов В, Г, Д | | | | - | | | | | | | | | | 7 | | | | | | |
| Высота головки "под ключ"  для шпилек типа В | | | | - | | | | | | | | | | 12 | | | 15 | | | 20 |
| Глубина резьбы осевого отверстия  для шпилек типов В, Г, Д | | | | - | | | | | | | | | | 30 | | | | | | |
| Размер "под ключ" для шпилек типа В | | 12 | | - | | | | | | | | | | 13 | 22 | | 27 | | | 32 |
| Длина ввинчиваемого резьбового конца | | номин. | | 15 | 18 | 22 | 28 | 30 | 35 | | 38 | 42 | | 50 | 58 | 65 | 70 | | 75 | 80 |
|  | | пред. откл. | | +1,8 | +2,1 | | +2,5 | | | | | | | +3,0 | | | +4,0 | | | |
| Высота цилиндрического выступа  для шпилек типа Г | | при нарезании резьбы | | - | | | | | | | | | | 15 | | | 25 | | | |
|  | | при накатке резьбы | | - | | | | | | | | | | | | | | | | |
| Высота головки  для шпилек типа В | | | | - | | | | | | | | | | 45 | 55 | 65 | 70 | | 75 | 85 |

Продолжение

мм

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Номинальный диаметр резьбы | | | | | 64 | (68) | 72 | (76) | 80 | 90 | 100 | | 110 | | (120) | 125 | 140 | 160 |
| Шаг резьбы | | крупный | | | 6 | | - | | | | | | | | | | | |
|  | | мелкий | | | 4 | | 4 и 6 | | | | | | | | | | | |
| Диаметр гладкой части | для шпилек типа А |  | | | По ГОСТ 19258-73 и ГОСТ 19256-73 | | | | | | | | | | | | | |
|  | для шпилек типов Б, В, Г, Д | 12 | | с крупным шагом | 54 | 56 | - | | | | | | | | | | | |
|  |  |  | | с мелким шагом | 58 | 62 | 66 | 70 | 74 | 84 | 94 | | | 104 | 114 | 119 | 134 | 154 |
|  |  |  | |  | - | | 64 | 68 | 72 | 80 | 92 | | | 102 | 112 | 116 | 132 | 152 |
| Диаметр осевого отверстия  для шпилек типов В, Г, Д | | | | | 10 и 20 | | | 20 | | | | | | | 35 | | | |
| Диаметр резьбы осевого отверстия  для шпилек типов В, Г, Д | | | | | М12 и М24 | | | М24 | | | | | | | М42 | | | |
| Диаметр расточки осевого отверстия для шпилек типов В, Г, Д | |  | | | 17 и 32 | | | 32 | | | | | | | 54 | | | |
|  | |  | | | - | | | 40 | | | | | | | 85 | | | |
| Диаметр цилиндрического выступа  для шпилек типа Г | | | | | 56 | 60 | 64 | 68 | 72 | 82 | 92 | | | 102 | 112 | 116 | 132 | 152 |
| Диаметр вписанной окружности  для шпилек типа В | | | | | 30 | | 32 | 35 | | 42 | 50 | | | | 60 | | 70 | 75 |
| Диаметр описанной окружности  для шпилек типа В | | | | | 40 | | 45 | | | 58 | 70 | | | | 80 | | 95 | 100 |
| Радиус перехода  для шпилек типов Б, В, Г, Д | | | | | 12 | 16 | | | | | | | | | | | | |
| Глубина расточки осевого отверстия  для шпилек типов В, Г, Д | | | | | 7 | | | 10 | | | | | | | 13 | | | |
| Высота головки "под ключ"  для шпилек типа В | | | | | 20 | | | 25 | | 30 | | 35 | | | 40 | | | 50 |
| Глубина резьбы осевого отверстия  для шпилек типов В, Г, Д | | | | | 30 и 50 | | | 50 | | | | | | | 75 | | | |
| Размер "под ключ" для шпилек типа В | | | 12 | | 32 | | 36 | | | 46 | | 55 | | | 65 | | 75 | 80 |
| Длина ввинчиваемого резьбового конца | | | номин. | | 90 | 95 | 100 | 105 | 110 | 125 | | 135 | | 150 | 160 | 170 | 190 | 220 |
|  | | | пред. откл. | | +4,0 | | | | | | | | | | | | | |
| Высота цилиндрического выступа  для шпилек типа Г | | | при нарезании резьбы | | 25 | | | | | | | | | | | | | |
|  | | | при накатке резьбы | | - | | | 35 | | | | | | 40 | | | | |
| Высота головки  для шпилек типа В | | | | | 90 | | | 100 | 115 | 120 | | | | 135 | 145 | | 160 | 180 |

Примечания:

1. Шпильки с размерами, заключенными в скобки, по возможности не применять.

2. Диаметр гладкой части  шпилек типа А с мелкой резьбой, выполняемой накаткой, при >52 мм должен быть равен среднему диаметру резьбы. Допускается диаметр гладкой части шпилек типов Б, В, Г и Д выполнять размером среднего диаметра резьбы, выполненной методом накатки.

3. Размеры радиусов перехода  и концевых фасок не распространяются на шпильки, резьба которых выполняется методом накатки.

4. Длину ввинчиваемого резьбового конца допускается выполнять равной 1,6 или 1,8 на шпильках всех типов.

5. Допускается на шпильках типов Г и Д не делать расточку осевого отверстия , при этом на шпильках типа Г цилиндрический выступ допускается выполнять по высоте *,* равной удвоенному шагу резьбы.

6. Допускается на шпильках типов В, Г и Д осевое отверстие выполнять диаметром , равным 6,7 мм для шпилек М30 и М36 и 8,5 мм для шпилек М42 и М48, размеры гнезда под рым-болт - по ГОСТ 4751-73.

7. Допускается уменьшение диаметра  на величину шага резьбы.

8. Допускается для шпилек типов В, Г, Д с номинальным диаметром резьбы до М60 осевое отверстие  и гнездо под рым-болт не выполнять.

9. Неуказанные предельные отклонения размеров: Н14, h14, ±ГОСТ 9066-75 Шпильки для фланцевых соединений с температурой среды от 0 °С до 650 °С. Типы и основные размеры (с Изменениями N 1, 2) по ГОСТ 25670-83.

 Таблица 2

мм

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Длина шпильки  js16 | Номинальный диаметр резьбы | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 10 | 12 | 16 | 20 | (22) | 24 | (27) | 30 | 36 | 42 | 48 | (52) | 56 | (60) | 64 | | (68) | 72 | (76) | 80 | 90 | 100 | 110 | (120) | 125 | 140 | 160 |
|  |  |  |  |  |  |  |  |  |  | Длина резьбового конца | | | | | | | | | | | |  |  |  |  |  |  |
| 45 | 22 | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 50 |  | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 55 |  | 25 | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 60 |  |  | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 65 |  |  | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 70 |  |  | 32 | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 75 |  |  |  | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 80 |  |  |  | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 85 |  |  |  | 40 | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 90 |  |  |  |  | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 95 |  |  |  |  | 45 | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 100 | 28 | 30 |  |  |  | - | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 110 |  |  |  |  |  | 48 | - | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 120 |  |  |  |  |  |  | 55 | - | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 130 |  |  | 40 |  |  |  |  | 60 | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 140 |  |  |  |  |  |  |  |  | - | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 150 |  |  |  |  |  |  |  |  | 70 | - | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 160 | - |  |  |  |  |  |  |  |  | 75 | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 170 | - |  |  | 48 |  |  |  |  |  |  | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 180 | - |  |  |  |  |  |  |  |  |  | - | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 190 | - |  |  |  | 52 |  |  |  |  |  | 90 | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 200 | - |  |  |  |  |  |  |  |  |  |  | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 210 | - | - |  |  |  | 58 |  |  |  |  |  | - | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 220 | - | - |  |  |  |  | 65 |  |  |  |  | 95 | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 230 | - | - |  |  |  |  |  |  |  |  |  |  | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 240 | - | - | - | - | - |  |  |  |  |  |  |  | - | - | | - | - | - | - | - | - | - | - | - | - | - | - |
| 250 | - | - | - | - | - |  |  | 70 | 80 |  |  |  | 105 | 115 | | 120 | - | - | - | - | - | - | - | - | - | - | - |
| 260 | - | - | - | - | - | - |  |  |  |  |  |  |  |  | |  | - | - | - | - | - | - | - | - | - | - | - |
| 270 | - | - | - | - | - | - |  |  |  |  |  |  |  |  | |  | - | - | - | - | - | - | - | - | - | - | - |
| 280 | - | - | - | - | - | - | - |  |  |  |  |  |  |  | |  | - | - | - | - | - | - | - | - | - | - | - |
| 290 | - | - | - | - | - | - | - |  |  |  |  |  |  |  | |  | - | - | - | - | - | - | - | - | - | - | - |
| 300 | - | - | - | - | - | - | - |  |  | 90 |  |  |  |  | |  | - | - | - | - | - | - | - | - | - | - | - |
| 310 | - | - | - | - | - | - | - |  |  |  |  |  |  |  | |  | - | - | - | - | - | - | - | - | - | - | - |
| 320 | - | - | - | - | - | - | - |  |  |  |  |  |  |  | |  | - | - | - | - | - | - | - | - | - | - | - |
| 330 | - | - | - | - | - | - | - |  |  |  |  |  |  |  | |  | 125 | - | - | - | - | - | - | - | - | - | - |
| 340 | - | - | - | - | - | - | - |  |  |  |  |  |  |  | |  |  | 135 | 135 | - | - | - | - | - | - | - | - |
| 350 | - | - | - | - | - | - | - | - |  |  | 100 |  |  |  | |  |  |  |  | 135 | - | - | - | - | - | - | - |
| 360 | - | - | - | - | - | - | - | - |  |  |  |  |  |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 370 | - | - | - | - | - | - | - | - |  |  |  |  |  |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 380 | - | - | - | - | - | - | - | - |  |  |  |  |  |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 390 | - | - | - | - | - | - | - | - |  |  |  | 105 |  |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 400 | - | - | - | - | - | - | - | - |  |  |  |  |  |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 410 | - | - | - | - | - | - | - | - | - |  |  |  |  |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 420 | - | - | - | - | - | - | - | - | - | - |  |  |  |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 430 | - | - | - | - | - | - | - | - | - | - |  |  | 120 |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 440 | - | - | - | - | - | - | - | - | - | - |  |  |  |  | |  |  |  |  |  |  | - | - | - | - | - | - |
| 450 | - | - | - | - | - | - | - | - | - | - | - |  |  |  | |  |  |  |  |  |  | 145 | - | - | - | - | - |
| 460 | - | - | - | - | - | - | - | - | - | - | - |  |  | 130 | |  |  |  |  |  |  |  | 145 | - | - | - | - |
| 470 | - | - | - | - | - | - | - | - | - | - | - |  |  |  | |  |  |  |  |  | 145 |  |  | - | - | - | - |
| 480 | - | - | - | - | - | - | - | - | - | - | - |  |  |  | |  |  |  |  |  |  |  |  | - | - | - | - |
| 490 | - | - | - | - | - | - | - | - | - | - | - |  |  |  | |  |  |  |  |  |  |  |  | - | - | - | - |
| 500 | - | - | - | - | - | - | - | - | - | - | - | - |  |  | | 135 |  |  |  |  |  |  |  | 175 | 175 | - | - |
| 510 | - | - | - | - | - | - | - | - | - | - | - | - |  |  | |  |  |  |  |  |  |  |  |  |  | - | - |
| 520 | - | - | - | - | - | - | - | - | - | - | - | - |  |  | |  |  |  |  |  |  |  |  |  |  | - | - |
| 530 | - | - | - | - | - | - | - | - | - | - | - | - | - |  | |  |  |  |  |  |  |  |  |  |  | - | - |
| 540 | - | - | - | - | - | - | - | - | - | - | - | - | - |  | |  |  |  |  |  |  |  |  |  |  | - | - |
| 550 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |  | 145 |  |  |  |  |  |  |  |  | - | - |
| 560 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |  |  |  |  |  |  |  |  |  |  | - | - |
| 570 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |  |  |  |  |  |  |  |  |  |  | - | - |
| 580 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |  |  |  |  |  |  |  |  |  |  | - | - |
| 590 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |  |  |  | 155 | 155 |  |  |  |  |  | - | - |
| 600 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |  |  |  |  |  | 165 | 165 | 165 |  |  | 210 | 240 |
| 610 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |  |  |  |  |  |  |  |  |  |  |  |
| 620 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |  |  |  |  |  |  |  |  |  |  |  |
| 630 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |  |  |  |  |  |  |  |  |  |  |  |
| 640 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |  |  |  |  |  |  |  |  |  |  |  |
| 650 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - |  |  |  |  |  |  |  |  |  |  |  |
| 660 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - |  |  |  |  |  |  |  |  |  |  |
| 670 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - |  |  |  |  |  |  |  |  |  |  |
| 680 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - |  |  |  |  |  |  |  |  |  |  |
| 690 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - |  |  |  |  |  |  |  |  |  |  |
| 700 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - |  |  |  |  |  |  |  |  |  |  |
| 710 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - |  |  |  |  |  |  |  |
| 720 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - |  |  |  |  |  |  |  |
| 730 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - |  |  |  |  |  |  |  |
| 740 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - |  |  |  |  |  |  |  |
| 750 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | | - | - | - | - | - |  |  |  |  |  |  |  |
| Предельные отклонения на длину | +3,0 | | | | | | | +3,5 | | | | | | | | +4,0 | | | | | | | | | | | |

     Примечания:

1. Шпильки с размерами, заключенными в скобки, по возможности не применять.

2. При применении шпилек с длиной более 750 мм длина резьбы шпилек должна соответствовать ряду Ra 40 ГОСТ 6636-69.

3. Длина  шпилек А2, Б2, В, Г и Д2 более 0,25  по ряду Rа 40 и дополнительному ряду ГОСТ 6636-69.

4. Допускается для шпилек типов В, Г и Д уменьшение длины резьбового конца , но не более чем на 0,25.

5. Длину шпилек  типов А и Б необходимо выбирать так, чтобы выступание шпильки из гайки типа А в резьбовом соединении было не менее шага резьбы, включая фаску на конце шпильки.  
       
       
     Примеры условных обозначений:  
       
     Шпилька типа А, исполнения 1, с диаметром резьбы 48 мм, с крупным шагом резьбы 5 мм, с полем допуска 6*g*, с  длиной шпильки 200 мм, с длиной резьбового конца 90 из стали марки ЭП182, категории IV, группы качества 2, без покрытия:

*Шпилька АМ48-6g* *200.90.ЭП182.IV.2 ГОСТ 9066-75*

     То же, исполнения 2, с мелким шагом резьбы 3 мм, с полем допуска 6*g*, с длиной ввинчиваемого  конца = 65 мм, с длиной резьбового конца = 90 мм, вакуумно-дугового переплава, без покрытия:

*Шпилька А2М48* *3-6g* *200*ГОСТ 9066-75 Шпильки для фланцевых соединений с температурой среды от 0 °С до 650 °С. Типы и основные размеры (с Изменениями N 1, 2)*ЭП182-ВД.III.2. ГОСТ 9066-75*

     То же, из стали 35, категории II, группы качества 3, с покрытием 02, толщиной 9 мкм:

*Шпилька А2М48* *3-6g* *200*ГОСТ 9066-75 Шпильки для фланцевых соединений с температурой среды от 0 °С до 650 °С. Типы и основные размеры (с Изменениями N 1, 2)*35.II.3.029 ГОСТ 9066-75*

(Измененная редакция, Изм. N 1, 2).

4. Резьба метрическая - по ГОСТ 24705-81.  
  
(Измененная редакция, Изм. N 2).

5. Масса шпилек приведена в cправочных приложениях 1-7.

6. Технические требования - по ГОСТ 20700-75.

7. (Исключен, Изм. N 2).

ПРИЛОЖЕНИЕ 1  
Справочное

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Длина шпильки   , мм | Теоретическая масса шпильки типа А исполнений 1 и 2, кг , при номинальном диаметре резьбы , мм | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 10 | | 12 | 16 | 20 | (22) | 24 | (27) | 30 | 36 | 42 | 48 | (52) | 56 | (60) | 64 | (68) | 72 | (76) | 80 | 90 | 100 | | 110 | (120) | 125 | 140 | 160 |
| 45 | 0,028 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 50 | 0,031 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 55 | 0,034 | | 0,041 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 60 | 0,037 | | 0,045 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 65 | 0,040 | | 0,049 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 70 | 0,043 | | 0,054 | 0,094 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 75 | 0,046 | | 0,058 | 0,102 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 80 | 0,049 | | 0,063 | 0,110 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 85 | 0,052 | | 0,067 | 0,118 | 0,178 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 90 | 0,055 | | 0,072 | 0,126 | 0,191 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 95 | 0,058 | | 0,076 | 0,134 | 0,203 | 0,246 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 100 | 0,061 | | 0,081 | 0,142 | 0,216 | 0,261 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 110 | 0,064 | | 0,090 | 0,158 | 0,241 | 0,291 | 0,336 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 120 | 0,067 | | 0,099 | 0,173 | 0,266 | 0,321 | 0,371 | 0,469 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 130 | 0,070 | | 0,108 | 0,189 | 0,290 | 0,350 | 0,407 | 0,514 | 0,623 |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 140 | 0,073 | | 0,117 | 0,205 | 0,315 | 0,380 | 0,442 | 0,559 | 0,679 |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 150 | 0,076 | | 0,126 | 0,221 | 0,340 | 0,410 | 0,477 | 0,603 | 0,734 | 1,042 |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 160 |  | | 0,135 | 0,236 | 0,364 | 0,440 | 0,513 | 0,648 | 0,790 | 1,122 | 1,520 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 170 |  | | 0,144 | 0,252 | 0,389 | 0,470 | 0,548 | 0,694 | 0,845 | 1,202 | 1,628 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 180 |  | | 0,153 | 0,268 | 0,413 | 0,499 | 0,584 | 0,738 | 0,901 | 1,282 | 1,737 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 190 |  | | 0,162 | 0,283 | 0,438 | 0,529 | 0,620 | 0,784 | 0,956 | 1,362 | 1,845 |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 200 | - | | 0,171 | 0,300 | 0,463 | 0,559 | 0,655 | 0,827 | 1,012 | 1,443 | 1,953 | 2,504 |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 210 | - | | - | 0,316 | 0,488 | 0,589 | 0,691 | 0,873 | 1,067 | 1,523 | 2,062 | 2,645 |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 220 | - | | - | 0,332 | 0,513 | 0,619 | 0,726 | 0,919 | 1,123 | 1,603 | 2,171 | 2,787 | 3,280 |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 230 | - | | - | 0,348 | 0,538 | 0,648 | 0,761 | 0,964 | 1,178 | 1,683 | 2,279 | 2,929 | 3,446 |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 240 | - | | - | - | - | - | 0,797 | 1,009 | 1,234 | 1,763 | 2,387 | 3,071 | 3,612 |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 250 | - | | - | - | - | - | 0,833 | 1,053 | 1,289 | 1,843 | 2,494 | 3,214 | 3,778 | 4,332 |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 260 | - | | - | - | - | - | - | 1,098 | 1,345 | 1,923 | 2,602 | 3,358 | 3,945 | 4,525 |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 270 | - | | - | - | - | - | - | 1,141 | 1,400 | 2,003 | 2,712 | 3,499 | 4,112 | 4,717 |  |  |  |  |  |  |  |  | |  |  |  |  |  |
| 280 | - | | - | - | - | - | - | - | 1,455 | 2,083 | 2,822 | 3,640 | 4,280 | 4,910 | 5,620 |  |  |  |  |  |  |  | |  |  |  |  |  |
| 290 | - | | - | - | - | - | - | - | 1,511 | 2,164 | 2,927 | 3,782 | 4,445 | 5,105 | 5,842 |  |  |  |  |  |  |  | |  |  |  |  |  |
| 300 | - | | - | - | - | - | - | - | 1,567 | 2,245 | 3,032 | 3,925 | 4,610 | 5,300 | 6,065 |  |  |  |  |  |  |  | |  |  |  |  |  |
| 310 | - | | - | - | - | - | - | - | 1,622 | 2,323 | 3,142 | 4,067 | 4,777 | 5,492 | 6,287 | 7,120 |  |  |  |  |  |  | |  |  |  |  |  |
| 320 | - | | - | - | - | - | - | - | 1,678 | 2,402 | 3,252 | 4,210 | 4,945 | 5,685 | 6,510 | 7,370 |  |  |  |  |  |  | |  |  |  |  |  |
| 330 | - | | - | - | - | - | - | - | 1,733 | 2,482 | 3,362 | 4,350 | 5,112 | 5,877 | 6,730 | 7,625 | 8,620 |  |  |  |  |  | |  |  |  |  |  |
| 340 | - | | - | - | - | - | - | - | 1,788 | 2,563 | 3,472 | 4,490 | 5,280 | 6,070 | 6,950 | 7,880 | 8,910 | 9,960 | 12,097 |  |  |  | |  |  |  |  |  |
| 350 | - | | - | - | - | - | - | - | - | 2,642 | 3,582 | 4,635 | 5,445 | 6,262 | 7,175 | 8,130 | 9,190 | 10,270 | 12,453 | 13,811 |  |  | |  |  |  |  |  |
| 360 | - | | - | - | - | - | - | - | - | 2,722 | 3,692 | 4,780 | 5,610 | 6,455 | 7,400 | 8,380 | 9,470 | 10,580 | 12,809 | 14,206 | 17,978 |  | |  |  |  |  |  |
| 370 | - | | - | - | - | - | - | - | - | 2,804 | 3,799 | 4,920 | 5,777 | 6,647 | 7,620 | 8,635 | 9,760 | 10,900 | 13,165 | 14,600 | 18,478 |  | |  |  |  |  |  |
| 380 | - | | - | - | - | - | - | - | - | 2,887 | 3,907 | 5,060 | 5,945 | 6,840 | 7,840 | 8,890 | 10,050 | 11,220 | 13,520 | 14,995 | 18,978 |  | |  |  |  |  |  |
| 390 | - | | - | - | - | - | - | - | - | 2,964 | 4,019 | 5,202 | 6,107 | 7,035 | 8,065 | 9,140 | 10,330 | 11,540 | 13,876 | 15,389 | 19,478 |  | |  |  |  |  |  |
| 400 | - | | - | - | - | - | - | - | - | 3,442 | 4,132 | 5,345 | 6,270 | 7,230 | 8,290 | 9,390 | 10,610 | 11,870 | 14,232 | 15,784 | 19,977 |  | |  |  |  |  |  |
| 410 | - | | - | - | - | - | - | - | - | - | 4,232 | 5,487 | 6,435 | 7,420 | 8,510 | 9,645 | 10,900 | 12,080 | 14,588 | 16,177 | 20,475 |  | |  |  |  |  |  |
| 420 | - | | - | - | - | - | - | - | - | - | - | 5,630 | 6,600 | 7,610 | 8,730 | 9,900 | 11,190 | 12,300 | 14,944 | 16,573 | 20,975 |  | |  |  |  |  |  |
| 430 | - | | - | - | - | - | - | - | - | - | - | 5,775 | 6,770 | 7,810 | 8,950 | 10,150 | 11,470 | 12,720 | 15,299 | 16,968 | 21,474 |  | |  |  |  |  |  |
| 440 | - | | - | - | - | - | - | - | - | - | - | 5,920 | 6,940 | 8,010 | 9,170 | 10,410 | 11,750 | 13,140 | 15,655 | 17,362 | 21,974 |  | |  |  |  |  |  |
| 450 | - | | - | - | - | - | - | - | - | - | - | - | 7,110 | 8,200 | 9,390 | 10,660 | 12,040 | 13,460 | 16,011 | 17,757 | 22,473 | 27,742 | |  |  |  |  |  |
| 460 | - | | - | - | - | - | - | - | - | - | - | - | 7,280 | 8,390 | 9,610 | 10,910 | 12,330 | 13,780 | 16,367 | 18,152 | 22,972 | 28,359 | | 34,316 |  |  |  |  |
| 470 | - | | - | - | - | - | - | - | - | - | - | - | 7,440 | 8,580 | 10,060 | 11,160 | 12,600 | 14,100 | 16,723 | 18,546 | 23,472 | 28,976 | | 35,062 |  |  |  |  |
| 480 |  | |  |  |  |  |  |  |  |  |  |  | 7,600 | 8,770 | 10,280 | 11,420 | 12,880 | 14,420 | 17,078 | 18,941 | 23,971 | 29,592 | | 35,808 |  |  |  |  |
| 490 |  | |  |  |  |  |  |  |  |  |  |  | 7,770 | 8,965 | 10,510 | 11,670 | 13,170 | 14,740 | 17,434 | 19,335 | 24,471 | 30,208 | | 36,554 |  |  |  |  |
| 500 |  | |  |  |  |  |  |  |  |  |  |  | 7,940 | 9,160 | 10,730 | 11,930 | 13,460 | 15,060 | 17,790 | 19,730 | 24,970 | 30,825 | | 37,300 | 44,390 | 48,165 |  |  |
| 510 |  | |  |  |  |  |  |  |  |  |  |  | - | 9,350 | 10,960 | 12,170 | 13,750 | 15,380 | 18,146 | 20,125 | 25,469 | 31,442 | | 38,046 | 45,278 | 49,128 |  |  |
| 520 |  | |  |  |  |  |  |  |  |  |  |  | - | 9,540 | 11,180 | 12,420 | 14,040 | 15,700 | 18,502 | 20,519 | 25,969 | 32,058 | | 38,792 | 46,166 | 50,092 |  |  |
| 530 |  | |  |  |  |  |  |  |  |  |  |  | - | - | 11,410 | 12,680 | 14,320 | 16,010 | 18,857 | 20,914 | 26,468 | 32,674 | | 39,538 | 47,053 | 51,055 |  |  |
| 540 |  | |  |  |  |  |  |  |  |  |  |  | - | - | 11,610 | 12,940 | 14,600 | 16,320 | 19,213 | 21,308 | 26,968 | 33,291 | | 40,286 | 47,941 | 52,018 |  |  |
| 550 |  | |  |  |  |  |  |  |  |  |  |  | - | - | - | 13,190 | 14,890 | 16,650 | 19,509 | 21,703 | 27,467 | 33,907 | | 41,030 | 48,829 | 52,982 |  |  |
| 560 |  | |  |  |  |  |  |  |  |  |  |  | - | - | - | 13,450 | 15,180 | 16,980 | 19,925 | 22,098 | 27,966 | 34,524 | | 41,776 | 49,717 | 53,945 |  |  |
| 570 |  | |  |  |  |  |  |  |  |  |  |  |  |  |  | 13,700 | 15,460 | 17,290 | 20,281 | 22,492 | 28,466 | 13,141\* | | 42,552 | 50,605 | 54,908 |  |  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_      \* Текст документа соответствует оригиналу. - Примечание изготовителя баз данных. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 580 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 13,950 | 15,740 | 17,610 | 20,636 | 22,887 | 28,965 | | 35,757 | 43,268 | 51,492 | 55,871 |  |  |
| 590 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 14,200 | 16,020 | 17,910 | 20,992 | 23,281 | 29,465 | | 36,374 | 44,014 | 52,380 | 56,835 |  |  |
| 600 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 14,450 | 16,310 | 18,210 | 21,348 | 23,676 | 29,964 | | 36,990 | 44,760 | 53,288 | 57,798 | 72,480 | 94,680 |
| 610 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 16,600 | 18,530 | 21,704 | 24,071 | 30,463 | | 37,606 | 45,506 | 54,156 | 58,761 | 73,688 | 96,258 |
| 620 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 16,890 | 18,860 | 22,060 | 24,466 | 30,963 | | 38,223 | 46,252 | 55,044 | 59,725 | 74,896 | 97,836 |
| 630 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 17,160 | 19,180 | 22,415 | 24,860 | 31,462 | | 38,840 | 46,998 | 55,931 | 60,688 | 76,104 | 99,414 |
| 640 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 17,440 | 19,510 | 22,771 | 25,254 | 31,962 | | 39,456 | 47,774 | 56,819 | 61,651 | 77,312 | 100,992 |
| 650 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 17,740 | 19,830 | 23,127 | 25,649 | 32,461 | | 40,072 | 48,490 | 57,707 | 62,614 | 78,520 | 102,570 |
| 660 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | 20,160 | 23,483 | 26,044 | 32,960 | | 40,689 | 49,236 | 58,595 | 63,578 | 79,728 | 104,148 |
| 670 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | 20,480 | 23,839 | 26,438 | 33,460 | | 41,306 | 49,982 | 59,483 | 64,541 | 80,936 | 105,728 |
| 680 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | 20,810 | 24,194 | 26,833 | 33,959 | | 41,922 | 50,728 | 60,370 | 65,504 | 82,144 | 107,304 |
| 690 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | 24,560 | 27,227 | 34,459 | | 42,538 | 51,474 | 61,258 | 66,468 | 83,359 | 108,882 |
| 700 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | 24,906 | 27,622 | 34,958 | | 43,155 | 52,220 | 62,146 | 67,431 | 84,560 | 110,460 |
| 710 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | - | - | 35,457 | | 43,772 | 52,966 | 63,034 | 68,394 | 85,768 | 112,038 |
| 720 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | - | - | 35,957 | | 44,388 | 53,712 | 63,922 | 69,358 | 86,976 | 113,616 |
| 730 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | - | - | 36,456 | | 45,004 | 54,458 | 64,809 | 70,321 | 88,184 | 115,194 |
| 740 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | - | - | 36,956 | | 45,621 | 55,204 | 65,697 | 71,284 | 89,392 | 116,772 |
| 750 | |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | - | - | 37,455 | | 46,238 | 55,950 | 66,585 | 72,248 | 90,600 | 118,350 |

## ПРИЛОЖЕНИЕ 2 (справочное)

ПРИЛОЖЕНИЕ 2  
Справочное

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Длина шпильки   , мм | Теоретическая масса шпильки типа Б, исполнения 1, кг , при номинальном диаметре резьбы , мм | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 10 | 12 | 16 | 20 | (22) | 24 | (27) | 30 | 36 | 42 | 48 | (52) | 56 | (60) | 64 | (68) | 72 | (76) | 80 | 90 | 100 | 110 | (120) | 125 | 140 | 160 |
| 45 | 0,028 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 50 | 0,030 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 55 | 0,031 | 0,040 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 60 | 0,033 | 0,044 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 65 | 0,036 | 0,048 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 70 | 0,038 | 0,052 | 0,097 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 75 | 0,040 | 0,056 | 0,104 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 80 | 0,041 | 0,059 | 0,111 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 85 | 0,043 | 0,063 | 0,118 | 0,170 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 90 | 0,045 | 0,067 | 0,125 | 0,180 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 95 | 0,047 | 0,071 | 0,132 | 0,190 | 0,222 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 100 | 0,049 | 0,075 | 0,139 | 0,200 | 0,247 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 110 | 0,053 | 0,082 | 0,153 | 0,220 | 0,271 | 0,328 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 120 | 0,054 | 0,090 | 0,166 | 0,240 | 0,296 | 0,358 | 0,462 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 130 | 0,055 | 0,098 | 0,180 | 0,260 | 0,321 | 0,388 | 0,501 | 0,628 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 140 | 0,056 | 0,115 | 0,194 | 0,280 | 0,345 | 0,418 | 0,539 | 0,677 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 150 | 0,057 | 0,123 | 0,208 | 0,300 | 0,370 | 0,448 | 0,578 | 0,725 | 1,007 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 160 | - | 0,130 | 0,222 | 0,320 | 0,395 | 0,477 | 0,616 | 0,773 | 1,074 | 1,500 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 170 | - | 0,138 | 0,236 | 0,340 | 0,419 | 0,507 | 0,655 | 0,822 | 1,141 | 1,594 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 180 | - | 0,145 | 0,250 | 0,360 | 0,444 | 0,537 | 0,694 | 0,870 | 1,209 | 1,688 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 190 | - | 0,153 | 0,264 | 0,380 | 0,469 | 0,567 | 0,732 | 0,918 | 1,276 | 1,782 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 200 | - | 0,160 | 0,277 | 0,400 | 0,493 | 0,597 | 0,771 | 0,967 | 1,343 | 1,876 | 2,497 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 210 | - | - | 0,291 | 0,420 | 0,518 | 0,627 | 0,809 | 1,015 | 1,410 | 1,969 | 2,622 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 220 | - | - | 0,305 | 0,440 | 0,543 | 0,656 | 0,848 | 1,063 | 1,477 | 2,063 | 2,747 | 3,257 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 230 |  |  | 0,319 | 0,460 | 0,567 | 0,686 | 0,886 | 1,112 | 1,544 | 2,157 | 2,872 | 3,405 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 240 |  |  |  |  |  | 0,716 | 0,925 | 1,160 | 1,611 | 2,251 | 2,996 | 3,553 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 250 |  |  |  |  |  | 0,746 | 0,963 | 1,209 | 1,679 | 2,345 | 3,121 | 3,701 | 4,168 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 260 |  |  |  |  |  |  | 1,002 | 1,257 | 1,746 | 2,438 | 3,246 | 3,849 | 4,334 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 270 |  |  |  |  |  |  | 1,040 | 1,305 | 1,813 | 2,532 | 3,371 | 3,997 | 4,501 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 280 |  |  | - | - | - | - | - | 1,354 | 1,880 | 2,626 | 3,496 | 4,145 | 4,668 | 5,414 |  |  |  |  |  |  |  |  |  |  |  |  |
| 290 |  |  |  |  |  |  |  | 1,402 | 1,947 | 2,720 | 3,621 | 4,293 | 4,293 | 5,607 |  |  |  |  |  |  |  |  |  |  |  |  |
| 300 |  |  |  |  |  |  |  | 1,450 | 2,014 | 2,813 | 3,746 | 4,441 | 5,001 | 5,800 |  |  |  |  |  |  |  |  |  |  |  |  |
| 310 |  |  |  |  |  |  |  | 1,499 | 2,081 | 2,907 | 3,870 | 4,589 | 5,168 | 5,994 | 6,880 |  |  |  |  |  |  |  |  |  |  |  |
| 320 |  |  |  |  |  |  |  | 1,547 | 2,148 | 3,001 | 3,995 | 4,737 | 5,335 | 6,187 | 7,102 |  |  |  |  |  |  |  |  |  |  |  |
| 330 |  |  |  |  |  |  |  | 1,595 | 2,216 | 3,095 | 4,120 | 4,885 | 5,501 | 6,381 | 7,324 | 8,333 |  |  |  |  |  |  |  |  |  |  |
| 340 |  |  |  |  |  |  |  | 1,644 | 2,283 | 3,189 | 3,245 | 5,033 | 5,668 | 6,574 | 7,546 | 8,586 | 9,980 | 11,710 |  |  |  |  |  |  |  |  |
| 350 |  |  |  |  |  |  |  |  | 2,350 | 3,282 | 4,370 | 5,181 | 5,835 | 6,767 | 7,768 | 8,839 | 10,270 | 12,023 | 13,351 |  |  |  |  |  |  |  |
| 360 |  |  |  |  |  |  |  |  | 2,417 | 3,376 | 4,495 | 5,329 | 6,002 | 6,961 | 7,990 | 9,091 | 10,560 | 12,319 | 13,686 | 17,528 |  |  |  |  |  |  |
| 370 |  |  |  |  |  |  |  |  | 2,484 | 3,470 | 4,619 | 5,477 | 6,168 | 7,154 | 8,212 | 9,344 | 10,860 | 12,625 | 14,030 | 17,958 |  |  |  |  |  |  |
| 380 |  |  |  |  |  |  |  |  | 2,551 | 3,564 | 4,744 | 5,626 | 6,335 | 7,347 | 8,434 | 9,596 | 11,150 | 12,920 | 14,365 | 18,398 |  |  |  |  |  |  |
| 390 |  |  |  |  |  |  |  |  | 2,618 | 3,657 | 4,869 | 5,773 | 6,507 | 7,541 | 8,656 | 9,849 | 11,440 | 13,226 | 14,699 | 18,828 |  |  |  |  |  |  |
| 400 |  |  |  |  |  |  |  |  | 2,686 | 3,751 | 4,994 | 5,921 | 6,668 | 7,734 | 8,878 | 10,100 | 11,740 | 13,522 | 15,044 | 19,267 |  |  |  |  |  |  |
| 410 |  |  |  |  |  |  |  |  |  | 3,845 | 5,119 | 6,069 | 6,835 | 7,927 | 9,100 | 10,350 | 12,030 | 13,822 | 15,377 | 19,695 |  |  |  |  |  |  |
| 420 |  |  |  |  |  |  |  |  |  |  | 5,244 | 6,217 | 7,002 | 8,121 | 9,322 | 10,600 | 12,320 | 14,134 | 15,713 | 20,135 |  |  |  |  |  |  |
| 430 |  |  |  |  |  |  |  |  |  |  | 5,369 | 5,365 | 7,169 | 8,314 | 9,544 | 10,850 | 12,620 | 14,429 | 16,048 | 20,564 |  |  |  |  |  |  |
| 440 |  |  |  |  |  |  |  |  |  |  | 5,493 | 6,513 | 7,335 | 8,507 | 9,766 | 11,110 | 12,910 | 14,735 | 16,392 | 21,004 |  |  |  |  |  |  |
| 450 |  |  |  |  |  |  |  |  |  |  |  | 6,661 | 7,502 | 8,701 | 9,988 | 11,360 | 13,200 | 15,031 | 16,727 | 21,433 | 26,592 |  |  |  |  |  |
| 460 |  |  |  |  |  |  |  |  |  |  |  | 6,809 | 7,669 | 8,894 | 10,210 | 11,610 | 13,500 | 15,337 | 17,062 | 21,872 | 27,129 | 32,966 |  |  |  |  |
| 470 |  |  |  |  |  |  |  |  |  |  |  | 6,957 | 7,835 | 9,087 | 10,430 | 11,860 | 13,790 | 15,633 | 17,406 | 22,312 | 27,676 | 33,632 | - | - | - | - |
| 480 |  |  |  |  |  |  |  |  |  |  |  | 7,105 | 8,002 | 9,281 | 10,650 | 12,120 | 14,080 | 15,938 | 17,741 | 22,741 | 28,222 | 34,298 |  |  |  |  |
| 490 |  |  |  |  |  |  |  |  |  |  |  | 7,253 | 8,169 | 9,474 | 10,870 | 12,370 | 14,380 | 16,244 | 18,075 | 23,181 | 28,768 | 34,964 |  |  |  |  |
| 500 |  |  |  |  |  |  |  |  |  |  |  | 7,402 | 8,336 | 9,668 | 11,090 | 12,620 | 14,670 | 16,540 | 18,410 | 23,610 | 29,305 | 35,631 | 43,090 | 46,805 |  |  |
| 510 |  |  |  |  |  |  |  |  |  |  |  |  | 8,502 | 9,861 | 11,310 | 12,870 | 14,970 | 16,846 | 18,755 | 24,049 | 29,852 | 36,296 | 43,888 | 47,775 |  |  |
| 520 |  |  |  |  |  |  |  |  |  |  |  |  | 8,669 | 10,050 | 11,540 | 13,130 | 15,260 | 17,142 | 19,089 | 24,479 | 30,398 | 36,962 | 44,686 | 48,552 |  |  |
| 530 |  |  |  |  |  |  |  |  |  |  |  |  |  | 10,250 | 11,760 | 13,380 | 15,550 | 17,447 | 19,424 | 24,918 | 30,944 | 37,628 | 45,483 | 49,425 |  |  |
| 540 |  |  |  |  |  |  |  |  |  |  |  |  |  | 10,440 | 11,980 | 13,630 | 15,850 | 17,743 | 19,758 | 25,348 | 31,491 | 38,294 | 46,291 | 50,298 |  |  |
| 550 |  |  |  |  |  |  |  |  |  |  |  |  |  | 10,630 | 12,200 | 13,880 | 16,140 | 18,049 | 20,103 | 25,787 | 32,027 | 38,960 | 47,089 | 51,162 |  |  |
| 560 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12,420 | 14,140 | 16,430 | 18,345 | 20,438 | 26,216 | 32,574 | 39,626 | 47,877 | 52,035 |  |  |
| 570 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12,650 | 14,390 | 16,730 | 18,651 | 20,772 | 26,656 | 33,121 | 40,292 | 48,685 | 52,908 |  |  |
| 580 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12,870 | 14,640 | 17,020 | 18,956 | 21,107 | 27,065 | 33,667 | 40,958 | 49,492 | 53,781 |  |  |
| 590 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 13,090 | 14,890 | 17,310 | 19,472 | 21,681 | 27,525 | 34,214 | 41,624 | 50,290 | 54,655 |  |  |
| 600 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 13,310 | 15,150 | 17,610 | 19,768 | 22,016 | 28,214 | 35,040 | 42,290 | 51,108 | 55,528 | 70,650 | 93,370 |
| 610 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 15,400 | 17,900 | 20,074 | 22,351 | 28,653 | 35,786 | 43,276 | 51,896 | 56,401 | 71,748 | 94,838 |
| 620 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 15,650 | 18,190 | 20,380 | 22,685 | 29,083 | 36,133 | 43,942 | 51,694 | 57,275 | 72,856 | 96,306 |
| 630 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 15,900 | 18,490 | 20,675 | 22,930 | 29,522 | 36,680 | 44,608 | 53,491 | 58,148 | 74,064 | 97,974 |
| 640 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 16,160 | 18,780 | 20,981 | 23,364 | 29,952 | 37,216 | 45,271 | 54,299 | 59,021 | 75,072 | 99,242 |
| 650 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 16,410 | 19,070 | 21,277 | 23,699 | 30,391 | 37,762 | 45,940 | 55,097 | 59,894 | 76,180 | 100,710 |
| 660 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 19,370 | 21,583 | 24,044 | 30,820 | 38,309 | 46,606 | 55,895 | 60,768 | 77,278 | 102,178 |
| 670 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 19,660 | 21,879 | 24,378 | 31,260 | 38,956 | 47,272 | 56,703 | 61,641 | 78,386 | 103,646 |
| 680 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 19,960 | 22,184 | 24,713 | 31,699 | 39,402 | 47,938 | 57,500 | 62,504 | 79,494 | 105,144 |
| 690 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 20,250 | 22,490 | 25,047 | 32,129 | 39,939 | 48,614 | 58,298 | 63,378 | 80,609 | 106,582 |
| 700 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 20,540 | 22,786 | 25,392 | 32,568 | 40,485 | 49,280 | 59,096 | 64,251 | 81,710 | 108,050 |
| 710 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 32,997 | 41,032 | 49,946 | 59,984 | 65,124 | 82,808 | 109,518 |
| 720 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 33,437 | 41,578 | 50,612 | 60,792 | 65,998 | 83,916 | 110,796 |
| 730 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 33,866 | 42,114 | 51,278 | 61,589 | 66,871 | 85,024 | 111,464 |
| 740 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 34,306 | 42,661 | 51,944 | 62,387 | 67,741 | 86,132 | 113,932 |
| 750 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 34,735 | 43,208 | 52,610 | 63,195 | 68,618 | 86,960 | 115,400 |

## ПРИЛОЖЕНИЕ 3 (справочное)

ПРИЛОЖЕНИЕ 3  
Справочное

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Длина шпильки   , мм | Теоретическая масса шпильки типа Б, исполнения 2, кг , при номинальном диаметре резьбы , мм | | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 10 | 12 | 16 | 20 | (22) | 24 | (27) | 30 | 36 | 42 | 48 | (52) | 56 | (60) | 64 | (68) | 72 | (76) | 80 | 90 | 100 | 110 | (120) | (125) | 140 | 160 |
| 45 | 0,021 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 50 | 0,023 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 55 | 0,025 | 0,038 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60 | 0,027 | 0,041 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 65 | 0,029 | 0,043 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 70 | 0,031 | 0,046 | 0,089 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 75 | 0,033 | 0,049 | 0,095 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 80 | 0,035 | 0,052 | 0,100 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 85 | 0,037 | 0,055 | 0,105 | 0,170 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 90 | 0,039 | 0,058 | 0,110 | 0,178 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 95 | 0,041 | 0,061 | 0,115 | 0,186 | 0,223 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 100 | 0,043 | 0,064 | 0,121 | 0,195 | 0,243 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 110 | 0,047 | 0,070 | 0,131 | 0,211 | 0,263 | 0,313 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 120 | 0,051 | 0,075 | 0,141 | 0,228 | 0,283 | 0,336 | 0,443 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 130 | 0,055 | 0,081 | 0,152 | 0,244 | 0,303 | 0,360 | 0,473 | 0,581 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 140 | 0,058 | 0,086 | 0,162 | 0,261 | 0,323 | 0,383 | 0,503 | 0,629 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 150 | 0,062 | 0,092 | 0,173 | 0,277 | 0,344 | 0,406 | 0,533 | 0,667 | 1,016 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 160 | - | 0,098 | 0,183 | 0,294 | 0,364 | 0,430 | 0,562 | 0,705 | 1,087 | 1,543 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 170 | - | 0,103 | 0,193 | 0,311 | 0,384 | 0,453 | 0,592 | 0,743 | 1,143 | 1,620 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 180 | - | 0,109 | 0,204 | 0,327 | 0,404 | 0,477 | 0,622 | 0,781 | 1,198 | 1,695 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 190 | - | 0,114 | 0,214 | 0,344 | 0,428 | 0,500 | 0,652 | 0,819 | 1,254 | 1,772 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 200 | - | 0,120 | 0,225 | 0,360 | 0,448 | 0,524 | 0,681 | 0,857 | 1,309 | 1,849 | 2,486 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 210 | - | - | 0,235 | 0,377 | 0,468 | 0,547 | 0,711 | 0,895 | 1,365 | 1,925 | 2,587 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 220 | - | - | 0,245 | 0,393 | 0,488 | 0,570 | 0,741 | 0,933 | 1,420 | 2,001 | 2,689 | 3,243 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 230 | - | - | 0,256 | 0,410 | 0,508 | 0,594 | 0,771 | 0,970 | 1,476 | 2,078 | 2,780 | 3,364 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 240 | - | - | - | - | - | 0,617 | 0,801 | 1,008 | 1,531 | 2,154 | 2,891 | 3,484 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 250 |  |  |  |  |  | 0,641 | 0,831 | 1,038 | 1,587 | 2,230 | 2,992 | 3,604 | 4,157 | 5,420 | 5,655 |  |  |  |  |  |  |  |  |  |  |  |
| 260 |  |  |  |  |  |  | 0,860 | 1,084 | 1,642 | 2,307 | 3,093 | 3,725 | 4,299 | 5,591 | 5,848 |  |  |  |  |  |  |  |  |  |  |  |
| 270 |  |  |  |  |  |  | 0,890 | 1,122 | 1,697 | 2,383 | 3,194 | 3,845 | 4,441 | 5,763 | 6,140 |  |  |  |  |  |  |  |  |  |  |  |
| 280 |  |  |  |  |  |  |  | 1,160 | 1,753 | 2,460 | 3,295 | 3,966 | 4,583 | 5,934 | 6,333 |  |  |  |  |  |  |  |  |  |  |  |
| 290 |  |  |  |  |  |  |  | 1,198 | 1,808 | 2,536 | 3,396 | 4,085 | 4,733 | 6,107 | 6,525 |  |  |  |  |  |  |  |  |  |  |  |
| 300 |  |  |  |  |  |  |  | 1,236 | 1,854 | 2,612 | 3,497 | 4,206 | 4,867 | 6,288 | 6,618 |  |  |  |  |  |  |  |  |  |  |  |
| 310 |  |  |  |  |  |  |  | 1,274 | 1,909 | 2,687 | 3,598 | 4,326 | 5,009 | 6,450 | 6,811 |  |  |  |  |  |  |  |  |  |  |  |
| 320 |  |  |  |  |  |  |  | 1,312 | 1,975 | 2,765 | 3,699 | 4,447 | 5,151 | 6,621 | 7,005 |  |  |  |  |  |  |  |  |  |  |  |
| 330 |  |  |  |  |  |  |  | 1,350 | 2,019 | 2,841 | 3,800 | 4,567 | 5,293 | 6,794 | 7,197 | 8,196 |  |  |  |  |  |  |  |  |  |  |
| 340 |  |  |  |  |  |  |  | 1,387 | 2,086 | 2,918 | 3,901 | 4,688 | 5,435 | 6,965 | 7,391 | 8,418 | 9,76 | 11,08 |  |  |  |  |  |  |  |  |
| 350 |  |  |  |  |  |  |  | - | 2,139 | 2,993 | 4,002 | 4,708 | 5,577 | 7,138 | 7,584 | 8,699 | 10,02 | 11,39 | 12,70 |  |  |  |  |  |  |  |
| 360 |  |  |  |  |  |  |  | - | 2,197 | 3,070 | 4,104 | 4,929 | 5,719 | 7,309 | 7,778 | 8,862 | 10,29 | 11,69 | 13,02 | 16,72 |  |  |  |  |  |  |
| 370 |  |  |  |  |  |  |  |  | 2,249 | 3,146 | 4,206 | 5,049 | 5,861 | 7,481 | 7,971 | 9,083 | 10,56 | 12,00 | 13,37 | 17,16 |  |  |  |  |  |  |
| 380 |  |  |  |  |  |  |  |  | 2,308 | 3,223 | 4,305 | 5,170 | 6,003 | 7,552 | 8,165 | 9,306 | 10,83 | 12,30 | 13,69 | 17,59 |  |  |  |  |  |  |
| 390 |  |  |  |  |  |  |  |  | 2,359 | 3,298 | 4,406 | 5,290 | 6,145 | 7,825 | 8,357 | 9,528 | 11,09 | 12,61 | 14,04 | 18,03 |  |  |  |  |  |  |
| 400 |  |  |  |  |  |  |  |  | 2,419 | 3,376 | 4,508 | 5,410 | 6,287 | 7,996 | 8,551 | 9,749 | 11,36 | 12,83 | 14,36 | 18,46 |  |  |  |  |  |  |
| 410 |  |  |  |  |  |  |  |  | - | 3,451 | 4,610 | 5,530 | 6,429 | 8,168 | 8,744 | 9,971 | 11,62 | 13,22 | 14,71 | 18,90 |  |  |  |  |  |  |
| 420 |  |  |  |  |  |  |  |  | - | - | 4,710 | 5,651 | 6,571 | 8,339 | 8,938 | 10,194 | 11,89 | 13,52 | 15,03 | 19,33 |  |  |  |  |  |  |
| 430 |  |  |  |  |  |  |  |  |  | - | 4,811 | 5,772 | 6,713 | 8,512 | 9,130 | 10,416 | 12,16 | 13,83 | 15,38 | 19,77 |  |  |  |  |  |  |
| 440 |  |  |  |  |  |  |  |  |  | - | 4,912 | 5,892 | 6,855 | 8,683 | 9,324 | 10,638 | 12,42 | 14,13 | 15,70 | 20,20 |  |  |  |  |  |  |
| 450 |  |  |  |  |  |  |  |  |  |  | - | 6,012 | 6,997 | 8,856 | 9,517 | 10,860 | 12,69 | 14,44 | 16,03 | 20,64 | 25,64 |  |  |  |  |  |
| 460 |  |  |  |  |  |  |  |  |  |  |  | 6,133 | 7,139 | 9,027 | 9,711 | 11,081 | 12,95 | 14,74 | 16,37 | 21,06 | 26,18 | 32,05 |  |  |  |  |
| 470 |  |  |  |  |  |  |  |  |  |  |  | 6,253 | 7,281 | 9,199 | 10,097 | 11,303 | 13,22 | 14,97 | 16,76 | 21,50 | 26,73 | 32,72 |  |  |  |  |
| 480 |  |  |  |  |  |  |  |  |  |  |  | 6,373 | 7,421 | 9,370 | 10,290 | 11,525 | 13,49 | 15,35 | 17,04 | 21,93 | 27,27 | 33,38 |  |  |  |  |
| 490 |  |  |  |  |  |  |  |  |  |  |  | 6,493 | 7,561 | 9,543 | 10,484 | 11,747 | 13,75 | 15,66 | 17,39 | 22,37 | 27,82 | 34,05 |  |  |  |  |
| 500 |  |  |  |  |  |  |  |  |  |  |  | 6,614 | 7,706 | 9,714 | 10,677 | 11,969 | 14,02 | 15,96 | 17,71 | 22,80 | 28,36 | 34,71 | 41,97 | 45,53 |  |  |
| 510 |  |  |  |  |  |  |  |  |  |  |  | - | 7,848 | 9,886 | 10,870 | 12,190 | 14,29 | 16,26 | 18,05 | 23,23 | 28,95 | 35,37 | 42,78 | 46,40 |  |  |
| 520 |  |  |  |  |  |  |  |  |  |  |  |  | 7,991 | 10,057 | 11,063 | 12,412 | 14,55 | 16,57 | 18,38 | 23,67 | 29,45 | 36,04 | 43,58 | 47,28 |  |  |
| 530 |  |  |  |  |  |  |  |  |  |  |  |  | - | 10,230 | 11,257 | 12,633 | 14,82 | 16,87 | 18,72 | 24,10 | 29,99 | 36,70 | 44,39 | 48,15 |  |  |
| 540 |  |  |  |  |  |  |  |  |  |  |  |  |  | 10,401 | 11,450 | 12,886 | 15,08 | 17,18 | 19,05 | 24,54 | 30,54 | 37,37 | 45,19 | 49,03 |  |  |
| 550 |  |  |  |  |  |  |  |  |  |  |  |  |  | 10,572 | 11,643 | 13,078 | 15,34 | 17,48 | 19,39 | 24,97 | 31,08 | 38,03 | 46,01 | 49,91 |  |  |
| 560 |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 11,836 | 13,300 | 15,62 | 17,79 | 19,72 | 25,41 | 31,63 | 38,70 | 46,80 | 50,78 |  |  |
| 570 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12,030 | 13,521 | 15,88 | 18,09 | 20,06 | 25,84 | 32,17 | 39,36 | 47,62 | 51,66 |  |  |
| 580 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12,223 | 13,743 | 16,15 | 18,75 | 20,39 | 26,28 | 32,72 | 40,03 | 48,41 | 52,53 |  |  |
| 590 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12,416 | 13,964 | 16,48 | 19,05 | 20,81 | 26,71 | 33,26 | 40,69 | 49,23 | 53,41 |  |  |
| 600 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12,609 | 14,187 | 16,74 | 19,36 | 21,14 | 27,24 | 33,89 | 41,36 | 50,03 | 54,29 | 68,96 | 91,18 |
| 610 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 14,409 | 17,01 | 19,66 | 21,48 | 27,67 | 34,43 | 42,12 | 50,84 | 55,26 | 70,07 | 92,64 |
| 620 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 14,631 | 17,27 | 19,97 | 21,87 | 28,11 | 34,98 | 42,79 | 51,64 | 56,04 | 71,19 | 94,11 |
| 630 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 14,853 | 17,54 | 20,27 | 22,15 | 28,54 | 35,52 | 43,45 | 52,45 | 56,91 | 72,30 | 95,57 |
| 640 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 14,966 | 17,81 | 20,58 | 22,48 | 28,98 | 36,07 | 44,12 | 53,25 | 57,79 | 73,42 | 97,04 |
| 650 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 15,188 | 18,07 | 20,88 | 22,82 | 29,41 | 36,61 | 44,78 | 54,07 | 58,67 | 74,54 | 98,51 |
| 660 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 18,34 | 21,19 | 23,15 | 29,85 | 37,16 | 45,45 | 54,86 | 59,54 | 75,65 | 99,97 |
| 670 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | 18,61 | 21,49 | 23,44 | 30,28 | 37,70 | 46,11 | 55,68 | 60,42 | 76,77 | 101,44 |
| 680 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 18,81 | 21,80 | 23,82 | 30,72 | 38,25 | 46,78 | 56,47 | 61,29 | 77,88 | 102,90 |
| 690 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 19,14 | 22,10 | 24,16 | 31,15 | 38,79 | 47,44 | 57,29 | 62,17 | 79,00 | 104,37 |
| 700 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 19,40 | 22,41 | 24,49 | 31,59 | 39,34 | 48,11 | 58,09 | 63,05 | 80,12 | 105,84 |
| 710 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | 32,02 | 39,88 | 48,77 | 58,90 | 63,92 | 81,23 | 107,36 |
| 720 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | 32,42 | 40,42 | 49,43 | 59,70 | 64,80 | 82,35 | 108,77 |
| 730 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 32,89 | 40,97 | 50,10 | 60,51 | 65,67 | 83,46 | 110,23 |
| 740 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 33,33 | 41,52 | 50,77 | 61,31 | 66,55 | 84,58 | 111,70 |
| 750 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 33,76 | 42,06 | 51,43 | 62,13 | 67,43 | 85,70 | 113,17 |

## ПРИЛОЖЕНИЕ 4 (справочное)

ПРИЛОЖЕНИЕ 4  
Справочное

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Длина шпильки  , мм | Теоретическая масса шпильки типа В, кг , при номинальном диаметре резьбы , мм | | | | | | | | | | | | | | | | | | |
|  | 30 | 36 | 42 | 48 | (52) | 56 | (60) | 64 | (68) | 72 | (76) | 80 | 90 | 100 | 110 | (120) | 125 | 140 | 160 |
| 130 | 0,488 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 140 | 0,518 | 1,072 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 150 | 0,548 | 1,122 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 160 | 0,578 | 1,172 | 1,692 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 170 | 0,608 | 1,222 | 1,762 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 180 | 0,638 | 1,272 | 1,832 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 190 | 0,668 | 1,322 | 1,902 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 200 | 0,698 | 1,372 | 1,972 | 2,682 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 210 | 0,728 | 1,422 | 2,042 | 2,782 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 220 | 0,758 | 1,472 | 2,112 | 2,882 | 3,409 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 230 | 0,788 | 1,522 | 2,182 | 2,982 | 3,529 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 240 | 0,818 | 1,572 | 2,252 | 3,082 | 3,649 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 250 | 0,858 | 1,622 | 2,322 | 3,182 | 3,769 | 4,261 | 5,433 | 6,100 |  |  |  |  |  |  |  |  |  |  |  |
| 260 | 0,888 | 1,672 | 2,392 | 3,282 | 3,889 | 4,391 | 5,593 | 6,270 |  |  |  |  |  |  |  |  |  |  |  |
| 270 | 0,918 | 1,732 | 2,462 | 3,382 | 4,009 | 4,521 | 5,753 | 6,440 |  |  |  |  |  |  |  |  |  |  |  |
| 280 | 0,948 | 1,782 | 2,532 | 3,482 | 4,129 | 4,651 | 5,913 | 6,610 |  |  |  |  |  |  |  |  |  |  |  |
| 290 | 0,978 | 1,832 | 2,602 | 3,582 | 4,249 | 4,781 | 6,073 | 6,780 |  |  |  |  |  |  |  |  |  |  |  |
| 300 | 1,008 | 1,882 | 2,672 | 3,682 | 4,369 | 4,911 | 6,233 | 6,950 |  |  |  |  |  |  |  |  |  |  |  |
| 310 | 1,038 | 1,932 | 2,762 | 3,782 | 4,489 | 5,041 | 6,393 | 7,120 |  |  |  |  |  |  |  |  |  |  |  |
| 320 | 1,068 | 1,982 | 2,832 | 3,882 | 4,609 | 5,171 | 6,553 | 7,290 |  |  |  |  |  |  |  |  |  |  |  |
| 330 | 1,098 | 2,032 | 2,902 | 3,982 | 4,729 | 5,301 | 6,713 | 7,460 | 8,390 |  |  |  |  |  |  |  |  |  |  |
| 340 | 1,128 | 2,082 | 2,972 | 4,082 | 4,849 | 5,431 | 6,873 | 7,630 | 8,580 | 10,576 | 11,188 |  |  |  |  |  |  |  |  |
| 350 | - | 2,132 | 3,042 | 4,132 | 4,969 | 5,561 | 7,033 | 7,800 | 8,770 | 10,836 | 11,468 | 12,778 |  |  |  |  |  |  |  |
| 360 | - | 2,182 | 3,112 | 4,182 | 5,089 | 5,691 | 7,193 | 7,970 | 8,960 | 11,096 | 11,748 | 13,078 | 17,816 |  |  |  |  |  |  |
| 370 | - | 2,232 | 3,182 | 4,282 | 5,209 | 5,821 | 7,353 | 8,140 | 9,150 | 11,356 | 12,028 | 13,398 | 18,226 |  |  |  |  |  |  |
| 380 | - | 2,282 | 3,252 | 4,382 | 5,329 | 5,951 | 7,513 | 8,310 | 9,340 | 11,616 | 12,308 | 13,698 | 18,636 |  |  |  |  |  |  |
| 390 | - | 2,332 | 3,322 | 4,482 | 5,369 | 6,081 | 7,673 | 8,480 | 9,530 | 11,876 | 12,588 | 14,018 | 19,046 |  |  |  |  |  |  |
| 400 | - | 2,382 | 2,392 | 4,582 | 5,449 | 6,211 | 7,833 | 8,650 | 9,720 | 12,136 | 12,868 | 14,318 | 19,456 |  |  |  |  |  |  |
| 410 | - | 2,432 | 2,462 | 4,682 | 5,569 | 6,341 | 7,993 | 8,820 | 9,910 | 12,396 | 13,148 | 14,638 | 19,866 |  |  |  |  |  |  |
| 420 | - | - | - | 4,782 | 5,689 | 6,471 | 8,153 | 8,990 | 10,100 | 12,656 | 13,428 | 14,938 | 20,276 |  |  |  |  |  |  |
| 430 |  |  |  | 4,882 | 5,809 | 6,641 | 8,313 | 9,160 | 10,290 | 12,916 | 13,708 | 15,258 | 20,686 |  |  |  |  |  |  |
| 440 |  |  |  | 4,982 | 5,929 | 6,771 | 8,473 | 9,330 | 10,480 | 13,176 | 13,988 | 15,558 | 21,096 |  |  |  |  |  |  |
| 450 |  |  |  |  | 6,049 | 6,901 | 8,633 | 9,500 | 10,670 | 13,436 | 14,268 | 15,678 | 21,506 | 27,669 |  |  |  |  |  |
| 460 |  |  |  |  | 6,169 | 7,031 | 8,793 | 9,670 | 10,860 | 13,696 | 14,548 | 16,178 | 21,916 | 28,189 | 34,444 |  |  |  |  |
| 470 |  |  |  |  | 6,289 | 7,161 | 9,003 | 9,840 | 11,050 | 13,956 | 14,828 | 16,498 | 22,326 | 28,709 | 35,084 |  |  |  |  |
| 480 |  |  |  |  | 6,409 | 7,291 | 9,163 | 10,010 | 11,240 | 14,216 | 15,108 | 16,798 | 22,736 | 29,229 | 35,724 |  |  |  |  |
| 490 |  |  |  |  | 6,529 | 7,421 | 9,323 | 10,180 | 11,430 | 14,476 | 15,388 | 17,118 | 23,146 | 29,749 | 36,364 |  |  |  |  |
| 500 |  |  |  |  | 6,649 | 7,551 | 9,483 | 10,350 | 11,620 | 14,736 | 15,668 | 17,418 | 23,556 | 30,269 | 37,004 | 42,563 | 46,123 |  |  |
| 510 |  |  |  |  |  | 7,681 | 9,643 | 10,590 | 11,810 | 14,996 | 15,948 | 17,738 | 23,966 | 30,789 | 37,644 | 43,303 | 46,923 |  |  |
| 520 |  |  |  |  |  | 7,811 | 9,803 | 10,770 | 12,000 | 15,256 | 16,228 | 18,038 | 24,376 | 31,309 | 38,284 | 44,043 | 47,723 |  |  |
| 530 |  |  |  |  |  |  | 9,963 | 10,930 | 12,190 | 15,516 | 16,508 | 18,358 | 24,786 | 31,829 | 38,924 | 44,783 | 48,523 |  |  |
| 540 |  |  |  |  |  |  | 10,123 | 11,110 | 12,380 | 15,776 | 16,788 | 18,658 | 25,196 | 32,349 | 39,564 | 45,523 | 49,323 |  |  |
| 550 |  |  |  |  |  |  | 10,283 | 11,270 | 12,690 | 16,036 | 17,068 | 18,978 | 25,606 | 32,869 | 40,204 | 46,263 | 50,123 |  |  |
| 560 |  |  |  |  |  |  |  | 11,450 | 12,880 | 16,296 | 17,348 | 19,278 | 26,016 | 33,389 | 40,844 | 47,003 | 50,923 |  |  |
| 570 |  |  |  |  |  |  |  | 11,610 | 13,070 | 16,556 | 17,628 | 19,598 | 26,426 | 33,909 | 41,484 | 47,743 | 51,723 |  |  |
| 580 |  |  |  |  |  |  |  | 11,790 | 13,260 | 16,816 | 18,258 | 19,898 | 26,836 | 34,429 | 42,124 | 48,483 | 52,523 |  |  |
| 590 |  |  |  |  |  |  |  | 11,950 | 13,450 | 17,136 | 18,538 | 20,298 | 27,246 | 34,949 | 42,764 | 49,223 | 53,323 |  |  |
| 600 |  |  |  |  |  |  |  | 12,130 | 13,640 | 17,396 | 18,818 | 20,598 | 27,656 | 35,469 | 43,404 | 49,963 | 54,123 | 71,666 | 95,825 |
| 610 |  |  |  |  |  |  |  |  | 13,830 | 17,659 | 19,098 | 20,918 | 28,066 | 36,069 | 44,044 | 50,703 | 54,923 | 72,706 | 97,215 |
| 620 |  |  |  |  |  |  |  |  | 14,020 | 17,916 | 19,378 | 21,218 | 28,476 | 36,589 | 44,684 | 51,443 | 55,723 | 73,746 | 98,605 |
| 630 |  |  |  |  |  |  |  |  | 14,210 | 18,176 | 19,658 | 21,538 | 28,886 | 37,109 | 45,324 | 52,183 | 56,523 | 74,786 | 99,995 |
| 640 |  |  |  |  |  |  |  |  | 14,400 | 18,436 | 19,938 | 21,838 | 29,296 | 37,629 | 45,964 | 52,923 | 57,323 | 75,826 | 101,385 |
| 650 |  |  |  |  |  |  |  |  | 14,590 | 18,696 | 20,218 | 22,158 | 29,706 | 38,149 | 46,604 | 53,663 | 58,123 | 76,866 | 102,775 |
| 660 |  |  |  |  |  |  |  |  |  | 18,956 | 20,498 | 22,458 | 30,116 | 38,669 | 47,244 | 54,403 | 58,923 | 77,906 | 104,165 |
| 670 |  |  |  |  |  |  |  |  |  | 19,216 | 20,778 | 22,778 | 30,526 | 39,189 | 47,884 | 55,143 | 59,723 | 78,946 | 105,555 |
| 680 |  |  |  |  |  |  |  |  |  | 19,476 | 21,058 | 23,078 | 30,936 | 39,709 | 48,524 | 55,883 | 60,523 | 79,986 | 106,945 |
| 690 |  |  |  |  |  |  |  |  |  | 19,736 | 21,338 | 23,398 | 31,346 | 40,229 | 49,164 | 56,623 | 61,323 | 81,026 | 108,335 |
| 700 |  |  |  |  |  |  |  |  |  | 19,996 | 21,618 | 23,698 | 31,756 | 40,749 | 49,804 | 57,363 | 62,123 | 82,066 | 109,725 |
| 710 |  |  |  |  |  |  |  |  |  |  |  |  | 32,166 | 41,269 | 50,444 | 58,103 | 62,923 | 83,106 | 111,115 |
| 720 |  |  |  |  |  |  |  |  |  |  |  |  | 32,576 | 41,789 | 51,084 | 58,843 | 63,723 | 84,146 | 112,505 |
| 730 |  |  |  |  |  |  |  |  |  |  |  |  | 32,986 | 42,309 | 51,724 | 59,583 | 64,523 | 85,186 | 113,895 |
| 740 |  |  |  |  |  |  |  |  |  |  |  |  | 33,396 | 42,829 | 52,364 | 60,323 | 65,323 | 86,226 | 115,285 |
| 750 |  |  |  |  |  |  |  |  |  |  |  |  | 33,806 | 43,349 | 53,004 | 61,063 | 66,123 | 87,266 | 116,675 |

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## ПРИЛОЖЕНИЕ 5 (справочное)

ПРИЛОЖЕНИЕ 5  
Справочное

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Длина шпильки   , мм | Теоретическая масса шпильки типа Г, кг , при номинальном диаметре резьбы , мм | | | | | | | | | | | | | | | | | | |
|  | 30 | 36 | 42 | 48 | (52) | 56 | (60) | 64 | (68) | 72 | (76) | 80 | 90 | 100 | 110 | (120) | 125 | 140 | 163 |
| 130 | 0,41 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 140 | 0,44 | 0,82 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 150 | 0,47 | 0,87 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 160 | 0,50 | 0,92 | 1,39 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 170 | 0,53 | 0,97 | 1,46 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 180 | 0,56 | 1,02 | 1,53 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 190 | 0,59 | 1,07 | 1,60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 200 | 0,62 | 1,12 | 1,67 | 2,34 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 210 | 0,65 | 1,17 | 1,74 | 2,44 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 220 | 0,68 | 1,22 | 1,81 | 2,54 | 2,97 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 230 | 0,71 | 1,27 | 1,88 | 2,64 | 3,09 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 240 | 0,74 | 1,32 | 1,95 | 2,74 | 3,21 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 250 | 0,78 | 1,37 | 2,02 | 2,84 | 3,33 | 3,79 | 4,68 | 5,30 |  |  |  |  |  |  |  |  |  |  |  |
| 260 | 0,81 | 1,42 | 2,09 | 2,94 | 3,45 | 3,92 | 4,84 | 5,47 |  |  |  |  |  |  |  |  |  |  |  |
| 270 | 0,84 | 1,48 | 2,16 | 3,04 | 3,57 | 4,05 | 5,00 | 5,64 |  |  |  |  |  |  |  |  |  |  |  |
| 280 | 0,87 | 1,53 | 2,23 | 3,14 | 3,69 | 4,18 | 5,16 | 5,81 |  |  |  |  |  |  |  |  |  |  |  |
| 290 | 0,90 | 1,58 | 2,30 | 3,24 | 3,81 | 4,31 | 5,32 | 5,98 |  |  |  |  |  |  |  |  |  |  |  |
| 300 | 0,93 | 1,63 | 2,37 | 3,34 | 3,93 | 4,44 | 5,48 | 6,15 |  |  |  |  |  |  |  |  |  |  |  |
| 310 | 0,96 | 1,68 | 2,46 | 3,44 | 4,06 | 4,57 | 5,64 | 6,32 |  |  |  |  |  |  |  |  |  |  |  |
| 320 | 0,99 | 1,73 | 2,53 | 3,54 | 4,17 | 4,70 | 5,80 | 6,49 |  |  |  |  |  |  |  |  |  |  |  |
| 330 | 1,02 | 1,78 | 2,60 | 3,64 | 4,29 | 4,83 | 5,96 | 6,66 | 7,59 |  |  |  |  |  |  |  |  |  |  |
| 340 | 1,05 | 1,83 | 2,67 | 3,74 | 4,41 | 4,96 | 6,12 | 6,83 | 7,78 | 9,55 | 10,24 |  |  |  |  |  |  |  |  |
| 350 |  | 1,88 | 2,74 | 3,79 | 4,53 | 5,09 | 6,28 | 7,00 | 7,97 | 9,81 | 10,52 | 11,83 |  |  |  |  |  |  |  |
| 360 |  | 1,93 | 2,81 | 3,84 | 4,65 | 5,22 | 6,44 | 7,17 | 8,16 | 10,07 | 10,80 | 12,13 | 15,83 |  |  |  |  |  |  |
| 370 |  | 1,98 | 2,88 | 3,94 | 4,77 | 5,35 | 6,60 | 7,34 | 8,35 | 10,33 | 11,08 | 12,45 | 16,24 |  |  |  |  |  |  |
| 380 |  | 2,03 | 2,95 | 4,04 | 4,89 | 5,48 | 6,76 | 7,51 | 8,54 | 10,59 | 11,36 | 12,75 | 16,65 |  |  |  |  |  |  |
| 390 |  | 2,08 | 3,02 | 4,14 | 4,93 | 5,61 | 6,92 | 7,68 | 8,73 | 10,85 | 11,64 | 13,07 | 17,06 |  |  |  |  |  |  |
| 400 |  | 2,13 | 3,09 | 4,24 | 5,01 | 5,74 | 7,08 | 7,85 | 8,92 | 11,11 | 11,92 | 13,37 | 17,47 |  |  |  |  |  |  |
| 410 |  | 2,18 | 3,16 | 4,34 | 5,13 | 5,87 | 7,24 | 8,02 | 9,11 | 11,37 | 12,20 | 13,69 | 17,88 |  |  |  |  |  |  |
| 420 |  |  |  | 4,44 | 5,25 | 6,00 | 7,40 | 8,19 | 9,30 | 11,63 | 12,48 | 13,99 | 18,29 |  |  |  |  |  |  |
| 430 |  |  |  | 4,54 | 5,37 | 6,17 | 7,56 | 8,36 | 9,49 | 11,89 | 12,76 | 14,31 | 18,70 |  |  |  |  |  |  |
| 440 |  |  |  | 4,64 | 5,49 | 6,30 | 7,72 | 8,53 | 9,68 | 12,15 | 13,04 | 14,61 | 19,11 |  |  |  |  |  |  |
| 450 |  |  |  |  | 5,61 | 6,43 | 7,88 | 8,70 | 9,87 | 12,41 | 13,32 | 14,93 | 19,52 | 24,52 |  |  |  |  |  |
| 460 |  |  |  |  | 5,73 | 6,56 | 8,04 | 8,87 | 10,06 | 12,67 | 13,60 | 15,23 | 19,92 | 25,04 | 30,91 |  |  |  |  |
| 470 |  |  |  |  | 5,85 | 6,69 | 8,25 | 9,04 | 10,25 | 12,93 | 13,88 | 15,55 | 20,33 | 25,56 | 31,55 |  |  |  |  |
| 480 |  |  |  |  | 5,97 | 6,82 | 8,41 | 9,21 | 10,44 | 13,19 | 14,16 | 15,85 | 20,74 | 26,08 | 32,19 |  |  |  |  |
| 490 |  |  |  |  | 6,09 | 6,95 | 8,57 | 9,38 | 10,63 | 13,45 | 14,44 | 16,17 | 21,15 | 26,60 | 32,83 |  |  |  |  |
| 500 |  |  |  |  | 6,21 | 7,08 | 8,73 | 9,55 | 10,82 | 13,71 | 14,72 | 16,47 | 21,56 | 27,12 | 33,47 | 38,17 | 41,73 |  |  |
| 510 |  |  |  |  |  | 7,21 | 8,89 | 9,79 | 11,01 | 13,97 | 15,00 | 16,79 | 21,97 | 27,64 | 34,11 | 38,91 | 42,53 |  |  |
| 520 |  |  |  |  |  | 7,34 | 9,05 | 9,97 | 11,20 | 14,23 | 15,28 | 17,09 | 22,38 | 28,16 | 34,75 | 39,63 | 43,33 |  |  |
| 530 |  |  |  |  |  |  | 9,21 | 10,13 | 11,39 | 14,49 | 15,56 | 17,41 | 22,79 | 28,68 | 35,39 | 40,37 | 44,13 |  |  |
| 540 |  |  |  |  |  |  | 9,37 | 10,31 | 11,58 | 14,75 | 15,84 | 17,71 | 23,20 | 29,20 | 36,03 | 41,09 | 44,93 |  |  |
| 550 |  |  |  |  |  |  | 9,53 | 10,47 | 11,89 | 15,01 | 16,12 | 18,03 | 23,61 | 29,72 | 36,67 | 41,83 | 45,73 |  |  |
| 560 |  |  |  |  |  |  |  | 10,65 | 12,08 | 15,27 | 16,40 | 18,33 | 24,02 | 30,24 | 37,31 | 42,55 | 46,53 |  |  |
| 570 |  |  |  |  |  |  |  | 10,81 | 12,27 | 15,53 | 16,68 | 18,65 | 24,43 | 30,76 | 37,95 | 43,29 | 47,33 |  |  |
| 580 |  |  |  |  |  |  |  | 10,99 | 12,46 | 15,79 | 17,31 | 18,95 | 24,84 | 31,28 | 38,59 | 44,01 | 48,13 |  |  |
| 590 |  |  |  |  |  |  |  | 11,15 | 12,65 | 16,11 | 17,59 | 19,35 | 25,25 | 31,80 | 39,23 | 44,75 | 48,93 |  |  |
| 600 |  |  |  |  |  |  |  | 11,33 | 12,84 | 16,37 | 17,87 | 19,65 | 25,75 | 32,40 | 39,87 | 45,47 | 49,73 | 64,40 | 86,62 |
| 610 |  |  |  |  |  |  |  |  | 13,03 | 16,63 | 18,15 | 19,97 | 26,16 | 32,92 | 40,61 | 46,21 | 50,53 | 65,44 | 88,01 |
| 620 |  |  |  |  |  |  |  |  | 13,22 | 16,89 | 18,43 | 20,27 | 26,57 | 33,44 | 41,25 | 46,93 | 51,33 | 66,48 | 89,40 |
| 630 |  |  |  |  |  |  |  |  | 13,41 | 17,15 | 18,71 | 20,59 | 26,98 | 33,96 | 41,89 | 47,67 | 52,13 | 67,52 | 90,79 |
| 640 |  |  |  |  |  |  |  |  | 13,60 | 17,41 | 18,99 | 20,89 | 27,39 | 34,48 | 42,53 | 48,39 | 52,93 | 68,56 | 92,18 |
| 650 |  |  |  |  |  |  |  |  | 13,79 | 17,67 | 19,27 | 21,21 | 27,80 | 35,00 | 43,17 | 49,13 | 53,73 | 69,60 | 93,57 |
| 660 |  |  |  |  |  |  |  |  |  | 17,93 | 19,55 | 21,51 | 28,21 | 35,52 | 43,81 | 49,85 | 54,53 | 70,64 | 94,96 |
| 670 |  |  |  |  |  |  |  |  |  | 18,19 | 19,83 | 21,83 | 28,62 | 36,04 | 44,45 | 50,59 | 55,33 | 71,68 | 96,35 |
| 680 |  |  |  |  |  |  |  |  |  | 18,45 | 20,11 | 22,13 | 29,03 | 36,56 | 45,09 | 51,31 | 56,13 | 72,72 | 97,74 |
| 690 |  |  |  |  |  |  |  |  |  | 18,71 | 20,39 | 22,45 | 29,44 | 37,08 | 45,73 | 52,05 | 56,93 | 73,76 | 99,13 |
| 700 |  |  |  |  |  |  |  |  |  | 18,97 | 20,67 | 22,75 | 29,85 | 37,60 | 46,37 | 52,77 | 57,73 | 74,80 | 100,52 |
| 710 |  |  |  |  |  |  |  |  |  |  |  |  | 30,26 | 38,12 | 47,01 | 53,51 | 58,53 | 75,84 | 101,91 |
| 720 |  |  |  |  |  |  |  |  |  |  |  |  | 30,67 | 38,64 | 47,65 | 54,23 | 59,33 | 76,88 | 103,30 |
| 730 |  |  |  |  |  |  |  |  |  |  |  |  | 31,08 | 39,16 | 48,29 | 54,97 | 60,13 | 77,92 | 104,69 |
| 740 |  |  |  |  |  |  |  |  |  |  |  |  | 31,49 | 39,68 | 48,93 | 55,69 | 60,93 | 78,96 | 106,08 |
| 750 |  |  |  |  |  |  |  |  |  |  |  |  | 31,90 | 40,20 | 49,57 | 56,43 | 61,73 | 80,00 | 107,47 |

## ПРИЛОЖЕНИЕ 6 (справочное)

ПРИЛОЖЕНИЕ 6  
Справочное

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Длина шпильки   , мм | Теоретическая масса шпильки типа Д, исполнения 1, кг , при номинальном диаметре резьбы , мм | | | | | | | | | | | | | | | | | | |
|  | 30 | 36 | 42 | 48 | (52) |  | (60) | 64 | (68) | 72 | (76) | 80 | 90 | 100 | 110 | (120) | 125 | 140 | 160 |
| 130 | 0,45 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 140 | 0,48 | 0,89 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 150 | 0,51 | 0,94 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 160 | 0,54 | 0,99 | 1,42 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 170 | 0,57 | 1,04 | 1,49 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 180 | 0,60 | 1,09 | 1,56 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 190 | 0,63 | 1,14 | 1,63 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 200 | 0,66 | 1,19 | 1,70 | 2,23 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 210 | 0,69 | 1,24 | 1,77 | 2,33 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 220 | 0,72 | 1,29 | 1,84 | 2,43 | 2,78 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 230 | 0,75 | 1,34 | 1,91 | 2,53 | 2,90 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 240 | 0,78 | 1,39 | 1,98 | 2,63 | 3,02 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 250 | 0,82 | 1,44 | 2,05 | 2,73 | 3,14 | 3,88 | 4,69 | 5,45 |  |  |  |  |  |  |  |  |  |  |  |
| 260 | 0,85 | 1,49 | 2,12 | 2,83 | 3,26 | 4,01 | 4,85 | 5,62 |  |  |  |  |  |  |  |  |  |  |  |
| 270 | 0,88 | 1,51 | 2,19 | 2,93 | 3,38 | 4,14 | 5,01 | 5,79 |  |  |  |  |  |  |  |  |  |  |  |
| 280 | 0,91 | 1,56 | 2,26 | 3,03 | 3,50 | 4,27 | 5,17 | 5,96 |  |  |  |  |  |  |  |  |  |  |  |
| 290 | 0,94 | 1,61 | 2,33 | 3,13 | 3,62 | 4,40 | 5,33 | 6,13 |  |  |  |  |  |  |  |  |  |  |  |
| 300 | 0,97 | 1,66 | 2,40 | 3,23 | 3,74 | 4,53 | 5,49 | 6,30 |  |  |  |  |  |  |  |  |  |  |  |
| 310 | 1,00 | 1,71 | 2,53 | 3,33 | 3,86 | 4,66 | 5,65 | 6,47 |  |  |  |  |  |  |  |  |  |  |  |
| 320 | 1,03 | 1,76 | 2,60 | 3,43 | 3,98 | 4,79 | 5,81 | 6,64 |  |  |  |  |  |  |  |  |  |  |  |
| 330 | 1,06 | 1,81 | 2,67 | 3,53 | 4,10 | 4,92 | 5,97 | 6,81 |  |  |  |  |  |  |  |  |  |  |  |
| 340 | 1,09 | 1,86 | 2,74 | 3,63 | 4,22 | 5,05 | 6,13 | 6,98 | 7,77 | 9,67 | 10,33 |  |  |  |  |  |  |  |  |
| 350 |  | 1,91 | 2,81 | 3,95 | 4,34 | 5,18 | 6,29 | 7,15 | 7,96 | 9,93 | 10,61 | 11,66 |  |  |  |  |  |  |  |
| 360 |  | 1,96 | 2,88 | 4,05 | 4,46 | 5,31 | 6,45 | 7,32 | 8,15 | 10,19 | 10,89 | 11,96 | 15,63 |  |  |  |  |  |  |
| 370 |  | 2,01 | 2,95 | 4,15 | 4,58 | 5,44 | 6,61 | 7,49 | 8,34 | 10,45 | 11,17 | 12,27 | 16,04 |  |  |  |  |  |  |
| 380 |  | 2,06 | 3,02 | 4,25 | 4,70 | 5,57 | 6,77 | 7,66 | 8,53 | 10,71 | 11,45 | 12,58 | 16,45 |  |  |  |  |  |  |
| 390 |  | 2,11 | 3,09 | 4,35 | 5,10 | 5,70 | 6,93 | 7,83 | 8,72 | 10,97 | 11,73 | 12,89 | 16,86 |  |  |  |  |  |  |
| 400 |  | 2,16 | 3,16 | 4,45 | 5,22 | 5,83 | 7,09 | 8,00 | 8,91 | 11,23 | 12,01 | 13,20 | 17,27 |  |  |  |  |  |  |
| 410 |  | 2,21 | 3,23 | 4,55 | 5,34 | 5,96 | 7,25 | 8,17 | 9,10 | 11,49 | 12,29 | 13,51 | 17,68 |  |  |  |  |  |  |
| 420 |  |  |  | 4,65 | 5,46 | 6,09 | 7,41 | 8,34 | 9,29 | 11,75 | 12,57 | 13,82 | 18,09 |  |  |  |  |  |  |
| 430 |  |  |  | 4,75 | 5,58 | 6,31 | 7,57 | 8,51 | 9,48 | 12,01 | 12,85 | 14,13 | 18,50 |  |  |  |  |  |  |
| 440 |  |  |  | 4,85 | 5,70 | 6,44 | 7,73 | 8,68 | 9,67 | 12,27 | 13,13 | 14,44 | 18,91 |  |  |  |  |  |  |
| 450 |  |  |  |  | 5,82 | 6,57 | 7,89 | 8,85 | 9,86 | 12,53 | 13,41 | 14,75 | 19,32 | 24,56 |  |  |  |  |  |
| 460 |  |  |  |  | 5,94 | 6,70 | 8,05 | 9,02 | 10,05 | 12,79 | 13,69 | 15,06 | 19,73 | 25,08 | 29,96 |  |  |  |  |
| 470 |  |  |  |  | 6,06 | 6,83 | 8,30 | 9,19 | 10,24 | 13,05 | 13,97 | 15,37 | 20,14 | 25,60 | 30,60 |  |  |  |  |
| 480 |  |  |  |  | 6,18 | 6,96 | 8,46 | 9,36 | 10,43 | 13,31 | 14,25 | 15,68 | 20,55 | 26,12 | 31,24 |  |  |  |  |
| 490 |  |  |  |  | 6,30 | 7,09 | 8,62 | 9,53 | 10,62 | 13,57 | 14,53 | 15,99 | 30,96 | 26,54 | 31,88 |  |  |  |  |
| 500 |  |  |  |  | 6,42 | 7,22 | 8,78 | 9,70 | 10,81 | 13,83 | 14,81 | 16,30 | 21,37 | 27,16 | 32,52 | 38,10 | 41,75 |  |  |
| 510 |  |  |  |  |  | 7,35 | 8,94 | 10,02 | 11,00 | 14,09 | 15,09 | 16,61 | 21,78 | 27,68 | 33,16 | 38,82 | 42,55 |  |  |
| 520 |  |  |  |  |  | 7,48 | 9,10 | 10,19 | 11,19 | 14,35 | 15,37 | 16,92 | 22,19 | 28,20 | 33,80 | 39,54 | 43,35 |  |  |
| 530 |  |  |  |  |  |  | 9,26 | 10,36 | 11,38 | 14,61 | 15,65 | 17,23 | 22,60 | 28,72 | 34,44 | 40,26 | 44,15 |  |  |
| 540 |  |  |  |  |  |  | 9,42 | 10,53 | 11,57 | 14,87 | 15,93 | 17,54 | 23,01 | 29,24 | 35,08 | 40,98 | 44,95 |  |  |
| 550 |  |  |  |  |  |  | 9,58 | 10,70 | 11,76 | 15,13 | 16,21 | 17,85 | 23,42 | 29,76 | 35,72 | 41,70 | 45,75 |  |  |
| 560 |  |  |  |  |  |  |  | 10,87 | 12,19 | 15,39 | 16,49 | 18,16 | 23,83 | 30,28 | 36,36 | 42,42 | 46,55 |  |  |
| 570 |  |  |  |  |  |  |  | 11,04 | 12,38 | 15,65 | 16,77 | 18,57 | 24,24 | 30,80 | 37,00 | 43,14 | 47,35 |  |  |
| 580 |  |  |  |  |  |  |  | 11,21 | 12,57 | 15,91 | 17,05 | 18,78 | 24,65 | 31,32 | 37,64 | 43,86 | 48,15 |  |  |
| 590 |  |  |  |  |  |  |  | 11,38 | 12,76 | 16,27 | 17,45 | 19,22 | 25,06 | 31,84 | 38,28 | 44,58 | 48,95 |  |  |
| 600 |  |  |  |  |  |  |  | 11,55 | 12,95 | 16,53 | 17,73 | 19,53 | 25,59 | 32,52 | 38,92 | 45,30 | 49,75 | 64,32 | 86,16 |
| 610 |  |  |  |  |  |  |  |  | 13,14 | 16,79 | 18,01 | 19,84 | 26,00 | 33,04 | 39,56 | 46,02 | 50,55 | 65,35 | 87,54 |
| 620 |  |  |  |  |  |  |  |  | 13,33 | 17,05 | 18,29 | 20,15 | 26,41 | 33,56 | 40,30 | 46,74 | 51,35 | 66,38 | 88,92 |
| 630 |  |  |  |  |  |  |  |  | 13,52 | 17,31 | 18,57 | 20,46 | 26,82 | 34,08 | 41,00 | 47,46 | 52,15 | 67,41 | 90,30 |
| 640 |  |  |  |  |  |  |  |  | 13,71 | 17,57 | 18,85 | 20,77 | 27,23 | 34,60 | 41,64 | 48,18 | 52,95 | 68,44 | 91,68 |
| 650 |  |  |  |  |  |  |  |  | 13,90 | 17,83 | 19,13 | 21,08 | 27,64 | 35,12 | 42,28 | 48,90 | 53,75 | 69,47 | 93,06 |
| 660 |  |  |  |  |  |  |  |  | 14,09 | 18,09 | 19,41 | 21,39 | 28,05 | 35,64 | 42,92 | 49,62 | 54,55 | 70,50 | 94,44 |
| 670 |  |  |  |  |  |  |  |  |  | 18,35 | 19,69 | 21,70 | 28,46 | 36,16 | 43,56 | 50,34 | 55,35 | 71,53 | 95,82 |
| 680 |  |  |  |  |  |  |  |  |  | 18,61 | 19,97 | 22,01 | 28,87 | 36,68 | 44,20 | 51,06 | 56,15 | 72,56 | 97,20 |
| 690 |  |  |  |  |  |  |  |  |  | 18,87 | 20,25 | 22,32 | 29,28 | 37,20 | 44,84 | 51,78 | 56,95 | 73,59 | 98,58 |
| 700 |  |  |  |  |  |  |  |  |  | 19,13 | 20,53 | 22,65 | 29,69 | 37,72 | 45,48 | 52,50 | 57,75 | 74,62 | 99,96 |
| 710 |  |  |  |  |  |  |  |  |  |  |  |  | 30,10 | 38,24 | 46,76 | 59,22 | 58,55 | 75,65 | 101,34 |
| 720 |  |  |  |  |  |  |  |  |  |  |  |  | 30,51 | 38,76 | 47,40 | 53,94 | 59,35 | 76,68 | 102,72 |
| 730 |  |  |  |  |  |  |  |  |  |  |  |  | 30,92 | 39,28 | 48,04 | 54,66 | 60,15 | 77,71 | 104,10 |
| 740 |  |  |  |  |  |  |  |  |  |  |  |  | 31,33 | 39,80 | 48,68 | 55,38 | 60,95 | 78,74 | 105,48 |
| 750 |  |  |  |  |  |  |  |  |  |  |  |  | 31,74 | 40,32 | 49,32 | 56,10 | 61,75 | 79,77 | 106,86 |

## ПРИЛОЖЕНИЕ 7 (справочное)

ПРИЛОЖЕНИЕ 7  
Справочное

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Длина шпильки   , мм | Теоретическая масса шпильки типа Д, исполнения 2, кг , при номинальном диаметре резьбы , мм | | | | | | | | | | | | | | | | | | |
|  | 30 | 36 | 42 | 48 | (52) | 56 | (60) | 64 | (68) | 72 | (76) | 80 | 90 | 100 | 110 | (120) | (125) | 140 | 160 |
| 130 | 0,41 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 140 | 0,44 | 0,82 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 150 | 0,47 | 0,87 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 160 | 0,50 | 0,92 | 1,39 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 170 | 0,53 | 0,97 | 1,46 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 180 | 0,56 | 1,02 | 1,53 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 190 | 0,59 | 1,07 | 1,60 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 200 | 0,62 | 1,12 | 1,67 | 2,34 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 210 | 0,65 | 1,17 | 1,74 | 2,44 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 220 | 0,68 | 1,22 | 1,81 | 2,54 | 2,97 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 230 | 0,71 | 1,27 | 1,88 | 2,64 | 3,09 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 240 | 0,74 | 1,32 | 1,95 | 2,74 | 3,21 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 250 | 0,78 | 1,37 | 2,02 | 2,84 | 3,33 | 3,79 | 4,68 | 5,30 |  |  |  |  |  |  |  |  |  |  |  |
| 260 | 0,81 | 1,42 | 2,09 | 2,94 | 3,45 | 3,92 | 4,84 | 5,47 |  |  |  |  |  |  |  |  |  |  |  |
| 270 | 0,84 | 1,48 | 2,16 | 3,04 | 3,57 | 4,05 | 5,00 | 5,64 |  |  |  |  |  |  |  |  |  |  |  |
| 280 | 0,87 | 1,53 | 2,23 | 3,14 | 3,69 | 4,18 | 5,16 | 5,81 |  |  |  |  |  |  |  |  |  |  |  |
| 290 | 0,90 | 1,58 | 2,30 | 3,24 | 3,81 | 4,31 | 5,32 | 5,98 |  |  |  |  |  |  |  |  |  |  |  |
| 300 | 0,93 | 1,63 | 2,37 | 3,34 | 3,93 | 4,44 | 5,48 | 6,15 |  |  |  |  |  |  |  |  |  |  |  |
| 310 | 0,96 | 1,68 | 2,46 | 3,44 | 4,05 | 4,57 | 5,64 | 6,32 |  |  |  |  |  |  |  |  |  |  |  |
| 320 | 0,99 | 1,73 | 2,53 | 3,54 | 4,17 | 4,70 | 5,80 | 6,49 |  |  |  |  |  |  |  |  |  |  |  |
| 330 | 1,02 | 1,78 | 2,60 | 3,64 | 4,29 | 4,83 | 5,96 | 6,66 | 7,59 |  |  |  |  |  |  |  |  |  |  |
| 340 | 1,05 | 1,83 | 2,67 | 3,74 | 4,41 | 4,96 | 6,12 | 6,83 | 7,78 | 9,55 | 10,24 |  |  |  |  |  |  |  |  |
| 350 |  | 1,88 | 2,74 | 3,79 | 4,53 | 5,09 | 6,28 | 7,00 | 7,97 | 9,81 | 10,52 | 11,83 |  |  |  |  |  |  |  |
| 360 |  | 1,93 | 2,81 | 3,84 | 4,65 | 5,22 | 6,44 | 7,17 | 8,16 | 10,07 | 10,80 | 12,13 | 15,83 |  |  |  |  |  |  |
| 370 |  | 1,98 | 2,88 | 3,94 | 4,77 | 5,35 | 6,60 | 7,34 | 8,35 | 10,33 | 11,08 | 12,45 | 16,24 |  |  |  |  |  |  |
| 380 |  | 2,03 | 2,95 | 4,04 | 4,89 | 5,48 | 6,76 | 7,51 | 8,54 | 10,59 | 11,36 | 12,75 | 16,65 |  |  |  |  |  |  |
| 390 |  | 2,08 | 3,02 | 4,14 | 4,93 | 5,61 | 6,92 | 7,68 | 8,73 | 10,85 | 11,64 | 13,07 | 17,06 |  |  |  |  |  |  |
| 400 |  | 2,13 | 3,09 | 4,24 | 5,01 | 5,74 | 7,08 | 7,85 | 8,92 | 11,11 | 11,92 | 13,37 | 17,47 |  |  |  |  |  |  |
| 410 |  | 2,18 | 3,16 | 4,34 | 5,13 | 5,87 | 7,24 | 8,02 | 9,11 | 11,37 | 12,20 | 13,69 | 17,88 |  |  |  |  |  |  |
| 420 |  |  |  | 4,44 | 5,25 | 6,00 | 7,40 | 8,19 | 9,30 | 11,63 | 12,48 | 13,99 | 18,29 |  |  |  |  |  |  |
| 430 |  |  |  | 4,54 | 5,37 | 6,17 | 7,56 | 8,36 | 9,49 | 11,89 | 12,76 | 14,31 | 18,70 |  |  |  |  |  |  |
| 440 |  |  |  | 4,65 | 5,49 | 6,30 | 7,72 | 8,53 | 9,68 | 12,15 | 13,04 | 14,61 | 19,11 |  |  |  |  |  |  |
| 450 |  |  |  |  | 5,61 | 6,43 | 7,88 | 8,70 | 9,87 | 12,41 | 13,32 | 14,93 | 19,52 | 24,52 |  |  |  |  |  |
| 460 |  |  |  |  | 5,73 | 6,56 | 8,04 | 8,87 | 10,06 | 12,67 | 13,60 | 15,23 | 19,92 | 25,04 | 30,91 |  |  |  |  |
| 470 |  |  |  |  | 5,85 | 6,69 | 8,25 | 9,04 | 10,25 | 12,93 | 13,88 | 15,55 | 20,33 | 25,56 | 31,55 |  |  |  |  |
| 480 |  |  |  |  | 5,97 | 6,82 | 8,41 | 9,21 | 10,44 | 13,19 | 14,16 | 15,85 | 20,74 | 26,08 | 32,19 |  |  |  |  |
| 490 |  |  |  |  | 6,09 | 6,95 | 8,57 | 9,38 | 10,63 | 13,45 | 14,44 | 16,17 | 21,15 | 26,60 | 32,83 |  |  |  |  |
| 500 |  |  |  |  | 6,21 | 7,08 | 8,73 | 9,55 | 10,82 | 13,71 | 14,72 | 16,47 | 21,56 | 27,12 | 33,47 | 38,17 | 41,73 |  |  |
| 510 |  |  |  |  |  | 7,21 | 8,89 | 9,79 | 11,01 | 13,97 | 15,00 | 16,79 | 21,97 | 27,64 | 34,11 | З8,91 | 42,53 |  |  |
| 520 |  |  |  |  |  | 7,34 | 9,05 | 9,97 | 11,20 | 14,23 | 15,28 | 17,09 | 22,68 | 28,16 | 34,75 | 39,63 | 43,33 |  |  |
| 530 |  |  |  |  |  |  | 9,21 | 10,13 | 11,39 | 14,49 | 15,56 | 17,41 | 22,79 |  |  |  |  |  |  |
| 540 |  |  |  |  |  |  | 9,37 | 10,31 | 11,58 | 14,75 | 15,84 | 17,71 | 23,20 | 29,20 | 36,03 | 41,09 | 44,93 |  |  |
| 550 |  |  |  |  |  |  | 9,53 | 10,47 | 11,89 | 15,01 | 16,12 | 18,03 | 23,61 | 29,72 | 36,67 | 41,83 | 45,73 |  |  |
| 560 |  |  |  |  |  |  |  | 10,65 | 12,08 | 15,27 | 16,40 | 18,33 | 24,02 | 30,24 | 37,31 | 42,55 | 46,53 |  |  |
| 570 |  |  |  |  |  |  |  | 10,81 | 12,27 | 15,53 | 16,68 | 18,65 | 24,43 | 30,76 | 37,95 | 43,29 | 47,33 |  |  |
| 580 |  |  |  |  |  |  |  | 10,99 | 12,46 | 15,79 | 17,31 | 18,95 | 24,84 | 31,28 | 38,59 | 44,01 | 48,13 |  |  |
| 590 |  |  |  |  |  |  |  | 11,15 | 12,65 | 16,11 | 17,59 | 19,35 | 25,25 | 31,80 | 39,23 | 44,75 | 48,93 |  |  |
| 600 |  |  |  |  |  |  |  | 11,33 | 12,84 | 16,37 | 17,87 | 19,65 | 25,75 | 32,40 | 39,87 | 45,47 | 49,73 | 64,40 | 86,62 |
| 610 |  |  |  |  |  |  |  |  | 13,03 | 16,63 | 18,15 | 19,97 | 26,16 | 32,92 | 40,61 | 46,21 | 50,53 | 65,44 | 88,01 |
| 620 |  |  |  |  |  |  |  |  | 13,22 | 16,89 | 18,43 | 20,27 | 26,57 | 33,44 | 41,25 | 46,93 | 51,33 | 66,48 | 89,40 |
| 630 |  |  |  |  |  |  |  |  | 13,41 | 17,15 | 18,71 | 20,59 | 26,98 | 33,96 | 41,89 | 47,67 | 52,13 | 67,52 | 90,79 |
| 640 |  |  |  |  |  |  |  |  | 13,60 | 17,41 | 18,99 | 20,89 | 27,39 | 34,48 | 42,53 | 48,39 | 52,93 | 68,56 | 92,18 |
| 650 |  |  |  |  |  |  |  |  | 13,79 | 17,67 | 19,27 | 21,21 | 27,80 | 35,00 | 43,17 | 49,13 | 53,73 | 69,60 | 93,57 |
| 660 |  |  |  |  |  |  |  |  |  | 17,93 | 19,55 | 21,51 | 28,21 | 35,52 | 43,81 | 49,85 | 54,53 | 70,64 | 94,96 |
| 670 |  |  |  |  |  |  |  |  |  | 18,19 | 19,83 | 21,83 | 28,62 | 36,04 | 44,45 | 50,59 | 55,33 | 71,68 | 96,35 |
| 680 |  |  |  |  |  |  |  |  |  | 18,45 | 20,11 | 22,13 | 29,03 | 36,56 | 45,09 | 51,31 | 56,13 | 72,72 | 97,74 |
| 690 |  |  |  |  |  |  |  |  |  | 18,71 | 20,39 | 22,45 | 29,44 | 37,08 | 45,73 | 52,05 | 56,93 | 73,76 | 99,13 |
| 700 |  |  |  |  |  |  |  |  |  | 18,97 | 20,67 | 22,75 | 29,85 | 37,60 | 46,37 | 52,77 | 57,73 | 74,80 | 100,52 |
| 710 |  |  |  |  |  |  |  |  |  |  |  |  | 30,26 | 38,12 | 47,01 | 53,51 | 58,53 | 75,84 | 101,91 |
| 720 |  |  |  |  |  |  |  |  |  |  |  |  | 30,67 | 38,64 | 47,65 | 54,23 | 59,33 | 76,88 | 103,30 |
| 730 |  |  |  |  |  |  |  |  |  |  |  |  | 31,08 | 39,16 | 48,29 | 54,97 | 60,13 | 77,92 | 104,69 |
| 740 |  |  |  |  |  |  |  |  |  |  |  |  | 31,49 | 39,68 | 48,93 | 55,69 | 60,93 | 78,96 | 106,08 |
| 750 |  |  |  |  |  |  |  |  |  |  |  |  | 31,90 | 40,20 | 49,57 | 56,43 | 61,73 | 80,00 | 107,47 |

      ПРИЛОЖЕНИЕ 8. (Исключено, Изм. N 2).

Электронный текст документа  
 сверен по:       
официальное издание  
М.: ИПК Издательство стандартов, 2003