of water any number of degrees, can be found by the common arithmetical rules of proportion.

The quantity of water at 212°, which will be converted into steam, may be found, by dividing the number of pounds of water in the table by 5.55. Thus, from the table—

1 lb. of Newcastle coal gives 180° to 55.5 lbs. of water. Therefore, 1 lb. of Newcastle coal converts into steam, } 55.5/5.5 =10lbs. of water

This is to be taken as the effect that may be produced if there be no material loss of heat ; and in the Cornish engines I find that even 10.5 lbs. are actually accomplished.

In general, however, for the purposes of ordinary manufactures, in Lancashire, Staffordshire, and the vicinity of London, it appears that not more than 6.6 lbs. of water are converted into steam by one pound of coal ; so that not more than 33.8 lbs. of water are heated with ordinary boilers from 32° to 212°. The following table may be taken as the numbers usually given to represent the actual state of practice. But a late investigation by Mr Parkes shows, that in the best constructions of boilers now used in Cornwall, Warwickshire, and elsewhere, these effects are nearly doubled :

1 lb. of the best coal is generally required to heat

33.3 lbs. of water from 32° to 212°.

1 lb 6.6 lbs. of water at 212° into steam.

and 1 lb 5.5 lbs. of water at 32° into steam.

2 lbs. nearly one cubic foot of water from 32° to

212

11 lbs. nearly one cubic foot of water at 212° into

steam.

13 lbs. nearly one cubic foot of water at 32° into

steam.

Now, as a gallon contains ten pounds of water, it follows that

1 lb. of coal will raise 3½ gallons of water from 32° to the boiling point.

5 lbs. of coal will convert 31/3 gallons of water at 212° into steam.

6 lbs. of coal will convert 31/3 gallons of water at 32° into steam.

We have given these approximate numbers for practical use, in the application of steam to some of the ordinary purposes and processes of art and domestic use, upon which we are about to enter ; and they are such as may, with very ordinary care, be safely calculated on. But for a full exposition of the processes, and principles, and mechanical arrangements connected with the best methods of generating steam from fuel, we must refer to the article "Steam-Engine” where the generation and condensation of steam find their most important uses.

It may perhaps be proper to remark, that a boiler, which is there called a boiler of one, two, or three horses’ power, is one which is capable of raising one, two, or three cubic feet of water into steam in an hour. Whatever, therefore, be the application for which steam is wanted, if twenty cubic feet of water per hour are required to be converted into steam, a twenty horsepower boiler is that

Dr Dalton’s Table of the Density of Air and Steam.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 100 cubical inches of air under 30 in Barom. and 60° Fahrenheit, being 31 grs. | | | | | | | | | | | |
| Tempe­  rature. | Vol. Air. under 30 in. | Weight of 100 cubic inches of steam. | Elasticity  of steam. | Temperature. | Vol. Air. under 30 in. | Weight of 100 cubic inches of steam. | Elasticity of steam. | Tempe­  rature. | Vol. Air. under 30 in. | Weight of 100 cubic inches  of steam. | Elasticity of steam. |
| Fahr  32° | 480 | .178 grs. | 0.26 | Fahr.  48° | 496 | .303 grs. | 0.46 | Fahr..  64° | 512 | .468 | 0.73 |
| 34 | 482 | .191 | 0.28 | 50 | 498 | .323 | 0.49 | 66 | 514 | .492 | 0.77 |
| 36 | 484 | .203 | 0.30 | 5? | 500 | .341 | 0.52 | 68 | 516 | .521 | 0.82 |
| 38 | 486 | .206 | 0.32 | 54 | 502 | .366 | 0.56 | 70 | 518 | .551 | 0.87 |
| 40 | 488 | 229 | 0.34 | 56 | 504 | .384 | 0.59 | 72 | 520 | .560 | 0.92 |
| 42 | 490 | .245 | 0.37 | 58 | 506 | .402 | 0.62 | 74 | 522 | .610 | 0.97 |
| 44 | 492 | .267 | 0.40 | 60 | 508 | .420 | 0.65 | 76 | 524 | .645 | 1.03 |
| 46 | 494 | .284 | 0.43 | 62 | 510 | .444 | 0.69 | 78 | 526 | .680 | 1.09 |
|  |  |  |  |  |  |  |  | 80 | 528 | .721 | 1.16 |

Gay Lussαc's Table of the Density and Volume of Steam.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Water at 32° being the unit of Density and Volume. | | | | | | | | | | | |
| Temp | Density. | Volume | Temperat. | Density | Vol. | Temperat. | Density. | Vol. | Temperat. | Density | Volume. |
| Fah. cent. 32.° 0° | 0.00000540 | 182323 | Fah. cent. 89.6° 32° | 000003263 | 30650 | Fahr. cent. 147.2° 64° | 0.00015010 | 6662 | Fah. cent.  204.8° 96° | 0.00051613 | 1938 |
| 35.6 2 | 609 | 164332 | 93.2 34 | 3619 | 27636 | 150.8 66 | 16356 | 6114 | 208.4 98 | 65191 | 1812 |
| 39.2 4 | 686 | 145886 | 96.8 36 | 4017 | 24897 | 154.4 68 | 17797 | 5619 | 212. 100 | 58955 | 1696 |
| 42.8 6 | 772 | 129587 | 100.4 38 | 4442 | 22513 | 158. 70 | 19355 | 5167 | 2505 121.4 | 0.0011147 | 897.09 |
| 46.4 8 | 869 | 115305 | 104. 40 | 4910 | 20343 | 101.6 72 | 21013 | 4759 | 275 2 135.1 | 16150 | 61919 |
| 50.0 10 | 974 | 102670 | 107.6 42 | 5418 | 18659 | 1652 74 | 22794 | 4387 | 293.7 145 4 | 20997 | 476.26 |
| 53.6 12 | 0.00001092 | 91564 | 111.2 44 | 6023 | 16805 | 1088 76 | 24702 | 4048 | 30754 153.8 | 25763 | 388.16 |
| 57.2 14 | 1224 | 81686 | 114.8 46 | 6585 | 15185 | 172.4 78 | 26739 | 3741 | 320.3 160.2 | 30402 | 328.83 |
| 60.8 16 | 1372 | 72913 | 118.4 48 | 7242 | 13809 | 176. 80 | 28889 | 3462 | 331 9 166.5 | 34911 | 286.12 |
| 64∙4 18 | 1534 | 65201 | 122. 50 | 7970 | 12546 | 179.0 82 | 31195 | 3206 | 341.7 172 1 | 39434 | 253 59 |
| 68. 20 | 1718 | 53224 | 125 6 52 | 8753 | 11424 | 183.2 84 | 33637 | 2973 | 358.8 181.6 | 48226 | 207.36 |
| 71.6 22 | 1914 | 52260 | 129 2 54 | 9606 | 10410 | 186∙8 86 | 36237 | 2760 | 418 4 214.7 | 89863 | 111.28 |
| 75.2 24 | 2133 | 46877 | 132 8 56 | 0.00010525 | 0501 | 190.4 88 | 38984 | 2585 | 457 1 2362 | 0.0129030 | 77 50 |
| 78.8 26 | 2.176 | 42084 | 130 4 58 | 11523 | 8680 | 194. 90 | 41891 | 2387 | 478 0 265.9 | 203060 | 49.315 |
| 82.4 28 86. 30 | 2643  2938 | 37838  34041 | 140. 60 143.6 62 | 12599  13760 | 7937  7267 | 197.6 92 201.2 94 | 44956  48201 | 2224  2075 |  |  |  |