TABLE 112. CUBIC INCHES OF AMMONIA VAPOR TO BE CIRCULATED TO PRODUCE ONE TON OF REFRIGERATION IN TWENTY-FOUR HOURS

Condenser Pressure		Gage	95	110	125	140	155	170	185	200	215	230	245
		Abs.	109.7	124.7	139.7	154.7	169.7	184.7	199.7	214.7	229.7	244.7	259.7
Temperature of Liquid			61° F.	68°	74.4°	80.3°	85.8°	91°	95.8°	100.3°	104.6°	108.7°	112.6°
Suction Pressure		Temp. of Suction	Ammonia Vapor in Cubic Feet per Minute										
Gage	Abs.												
5" V.	12.2#	−33.6° F	14,880	15,100	15,310	15,525	15,750	15,975	16,175	16,375	16,575	16,775	16,975
4"	12.7	−32.3°	14,320	14,550	14,750	14,950	15,170	15,375	15,560	15,750	15,940	16,120	16,310
3"	13.2	−30.9°	13,820	14,040	14,240	14,440	14,630	14,825	15,010	15,190	15,375	15,560	15,740
2"	13.7	−29.6°	13,340	13,540	13,720	13,920	14,110	14,300	14,480	14,660	14,840	15,010	15,190
1"	14.2	−28.4°	12,885	13,075	13,250	13,445	13,640	13,820	13,990	14,150	14,320	14,490	14,660
0#	14.7	−27.1°	12,460	12,650	12,840	13,020	13,200	13,375	13,540	13,700	13,860	14,025	14,190
1#	15.7	−24.8°	11,700	11,855	12,020	12,210	12,380	12,545	12,720	12,875	13,010	13,150	13,305
2	16.7	−22.6°	11,005	11,160	11,340	11,500	11,660	11,810	11,950	12,100	12,240	12,400	12,540
3	17.7	−20.4°	10,410	10,575	10,710	10,850	11,020	11,175	11,310	11,450	11,590	11,730	11,860
4	18.7	−18.4°	9885	10,020	10,180	10,310	10,450	10,595	10,720	10,850	10,990	11,110	11,225
5	19.7	−16.5°	9400	9540	9690	9820	9960	10,090	10,210	10,340	10,450	10,580	10,700
8	22.7	−11.0°	8200	8310	8425	8550	8675	8790	8895	9000	9100	9200	9305
10	24.7	−7.7°	7550	7670	7770	7880	7990	8090	8190	8290	8390	8480	8580
12	26.7	−4.7°	7010	7110	7210	7320	7420	7520	7610	7700	7795	7880	7980
15	29.7	−0.3°	6320	6420	6510	6610	6695	6790	6860	6940	7025	7110	7190
20	34.7	+6.1°	5445	5530	5605	5690	5750	5825	5905	5990	6040	6110	6190
25	39.7	+11.9°	4780	4850	4910	4990	5050	5110	5190	5240	5300	5380	5420
30	44.7	+17.0°	4250	4310	4380	4440	4500	4560	4620	4680	4725	4790	4840
35	49.7	+21.8°	3850	3910	3970	4020	4070	4120	4170	4220	4270	4320	4370
40	54.7	+26.2°	3510	3560	3610	3655	3705	3760	3810	3855	3905	3940	3980
45	59.7	+30.3°	3220	3280	3320	3360	3410	3450	3500	3540	3590	3630	3680
50	64.7	+34.1°	2980	3020	3070	3110	3150	3190	3225	3275	3310	3350	3390

Some of the advantages of the double pipe condenser are that it may be placed near the other apparatus and does not have to be placed outside as in the case of the atmospheric condenser. Further, on the double pipe condenser the cold water enters on the bottom and meets the liquid ammonia, sending the liquid ammonia away much cooler than in the case of the atmospheric condenser, where the hot water comes in contact with the liquid ammonia.

When an atmospheric condenser is worn out it must be entirely scrapped, while in a double pipe condenser, the water pipes, which are the only pipes to deteriorate can easily be replaced. Another advantage of the double pipe type is that it is easily cleaned by a spiral tube cleaner, while it is a much more tedious and uncertain job to clean the outside of the atmospheric condenser. The submerged condenser consisting of a tank containing water in which a coil conveying the ammonia is submerged is seldom used now.

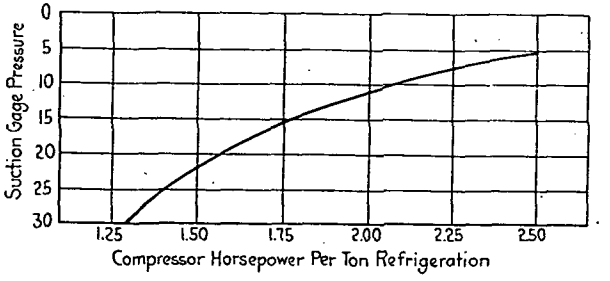

FIG. 73. RELATIVE HORSE-POWER CONSUMPTION AT VARIOUS BACK PRESSURES

The capacity of an ammonia compressor is governed mostly by the pressure of the ammonia gas, or vapor entering it. The higher the pressure the heavier the ammonia and consequently more pounds of ammonia will be pumped through the system per stroke of the compressor. The refrigeration accomplished is directly proportioned to the pounds of ammonia circulated in a given time. The higher the suction or inlet pressure the greater will be the refrigerating capacity of that plant. Roughly about 0.43 lb. of ammonia must be circulated through the system per minute per ton of refrigeration.

When cooling and holding products in a room, the temperature at which they must be held will be determined largely by the nature of the goods Table 116. The circulating ammonia must be several degrees lower in temperature than the room. Ammonia at any stated temperature has a relative pressure which would consequently be the pressure of the ammonia entering the compressor and would therefore govern the capacity of it. It is desirable, from the power consumption basis, to operate the compressor with the highest possible back pressure, but this hardly ever exceeds 40-lb. gage pressure. Fig. 73 shows the relative horse-power consumption at various back pressures. This curve based upon averages and practical installations might deviate somewhat.