

60 Refrigerating machinery (except domestic type refrigerators)

This Report on the Refrigerating Machinery (Except Domestic Type Refrigerators) Industry relates to establishments engaged wholly or mainly in manufacturing refrigerating machinery, commercial refrigerators and commercial refrigerating equipment, including deep freeze and quick freeze machinery. Domestic type refrigerators and deep freeze units (including non-electric refrigerators) are excluded.

This industry corresponds to minimum list heading 339(3) in the Standard Industrial Classification (Revised 1968) which has been used for the first time as a basis of classification in the 1968 Census.

The industry formed part of the Miscellaneous (Non-electrical) Machinery Industry (Part 49) in the Reports on the last detailed Census of Production for 1963 corresponding to the sub-division 'refrigerating machinery' except that domestic refrigerators and freezers, self-contained, complete and parts are now included in Electric Appliances Primarily for Domestic Use (Part 78). In addition the treatment of parts has been altered considerably for 1968 for this and other mechanical engineering industries. The distinction made in the 1963 reports between parts sold in association with the sale of complete machines, and other parts sold, has been discontinued for 1968 and all parts are now treated in the same way as the complete machines for classification, ie as principal products of their respective mechanical engineering industries and shown in Table 5.

Throughout this Report, the figures given for 1963 have been reclassified, as far as possible, according to the Standard Industrial Classification (Revised 1968) and to take account of the different treatment of parts adopted for 1968 so that data for 1963 and 1968 are on the same industrial basis. However the reclassification of small firms, which provided limited information only, has been arbitrary.

METHOD OF CLASSIFICATION

In classifying returns to this industry the value of unspecified work done (other than structural and installation work) including repair work, was not taken into account unless it amounted to 80 per cent. or more of the total output of the return in which case the return was classified to General Mechanical Engineering (Part 66). The amount charged for erecting and installing machinery and plant (other than air-conditioning, heating and ventilating plant) was treated as part of the selling value of these items in determining the industrial classification of returns. The standard classification procedure as outlined in the notes on page (i) was further modified where a return would have been classified to one of the mechanical engineering industries relating to a specific class of machinery (viz. Parts 50 to 66) but where the sales of the principal products of the industry concerned (including parts) accounted for less than 20 per cent. of the total output: in such cases the return was classified to the residual sub-division of the General Mechanical Engineering Industry (Part 66).

In interpreting the data in the tables it is essential to bear in mind the notes and definitions which appear on pages (i) to (iv).

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(c) Including services rendered to other organisations (amounts charged for hiring out plant, machinery or other goods, for providing transport, or for technical or other services rendered).

(d) Administrative, technical and clerical employees.

(e) Excluding expenditure for establishments not yet in production.

(f) Acquisitions less disposals.

TABLE 1 Industry summary, 1963 and 1968
United Kingdom (a) (b)

	Unit	All establishments		
		1963	1968	
Number of enterprises	No.	85	116	
Number of establishments	"	111	139	
Gross output	£'000	31,154	39,646	
Net output	"	14,501	18,557	
Net output per head	£	1,512	2,165	
Sales and work done	£'000	goods produced and work done (c)	30,062	38,809
		merchanted goods and canteen takings	1,461	1,707
Purchases	"	materials for use in production and packaging and fuel	14,500	18,260
		goods for merchandising and canteen purchases	1,174	1,640
Payments to other organisations	"	for work done on materials given out for transport	772	1,953
		by road	215	185
		by rail and other means excluding postal services			34
Stocks and work in progress	"	- 361	+ 111	
Total stocks and work in progress	"	change during year	12,431	12,020
		at end of year	- 68	+ 351
Goods on hand for sale	"	change during year	2,274	2,397
		at end of year	- 301	- 1,221
Work in progress	"	change during year	6,057	4,820
		at end of year	+ 8	+ 982
Materials, stores and fuel	"	change during year	4,100	4,803
		at end of year	Th. 9.6	8.6
Number employed on average during the year	"	total, including working proprietors	6.4	5.1
		operatives	3.1	3.4
		other employees (d)	£'000 5,264	5,600
Wages and salaries	"	of operatives	2,863	4,028
		of other employees (d)		
Capital expenditure (e)	"	759	950	
Total	"	234	91	
New building work	"	4	6	
Land and existing buildings (f)	"	432	688	
Plant and machinery (f)	"	89	177	
Vehicles (f)	"			

(a) For 1968, estimates for establishments not making satisfactory returns and for small establishments, from which only employment data were collected, accounted for 13 per cent. of the total figures in which they were incorporated: of this, unsatisfactory returns accounted for 2 per cent. For 1963 the comparable figures were 8 per cent. and 2 per cent. respectively.

(b) The following information relates to small establishments (employing fewer than 25 persons) in this industry. It includes an estimate for small establishments not making satisfactory returns.

	1963	1968
Number of establishments	65	92
Average number employed:		
Working proprietors	83	116
Other persons employed	559	835

Footnotes continued on page 60/2.

TABLE 2 Analysis by size of establishment within the industry, 1968

(i) Output and employment

All establishments: United Kingdom

Number employed on average during the year by the establishment (a)	Establishments		Total number employed on average during the year (a)	Gross output	Net output	Net output per head
	Number	Enterprises (b)				
1-5	21	21	68	..	..	..
6-10	25	25	199	..	..	..
11-24	38	37	646	..	..	..
25-49	15	14	570	2,869	1,197	2,100
50-99	11	10	779	4,108	1,666	2,139
100-199	11	9	1,520	6,858	3,187	2,097
200-499	4	4	1,283	7,618	3,294	2,567
500 and over	3	3	3,314	13,095	6,826	2,060
Unsatisfactory returns	11	11	192	..	..	..
Total	139	116	8,571	39,646(c)	18,557(c)	2,165(c)

(ii) Employees, wages and salaries

All establishments: United Kingdom

Number employed on average during the year by the establishment (a)	Employees		Wages and salaries		Wages and salaries per head	
	Operatives	Others (d)	Operatives	Others (d)	Operatives	Others (d)
1-5	..	..	..	..	..	..
6-10	..	..	..	..	..	..
11-24	..	..	..	..	..	..
25-49	364	196	410	234	1,127	1,195
50-99	525	251	600	293	1,142	1,166
100-199	1,087	431	1,088	553	1,001	1,284
200-499	696	587	804	747	1,155	1,272
500 and over	1,825	1,489	2,044	1,729	1,120	1,161
Unsatisfactory returns	..	..	..	..	..	..
Total	5,089(c)	3,350(c)	5,600(c)	4,028(c)	1,100(c)	1,202(c)

(a) Including working proprietors.

(b) The sum of the figures for the size groups exceeds the total for the industry to the extent that enterprises made returns for establishments in more than one size group.

(c) Including estimates for establishments employing fewer than 25 persons and for establishments not making satisfactory returns.

(d) Administrative, technical and clerical employees.

TABLE 3 Percentage analysis of employees, by age and sex, 1969 (a)

All establishments: United Kingdom

Ages	Males	Females	All employees
	Per cent.	Per cent.	Per cent.
Under 18	3	1	4
18 and over	80	16	96
All ages	83	17	100

Source: Department of Employment

(a) The percentages relate to the numbers employed (excluding working proprietors) in the 'other machinery' industries - minimum list heading 339 - at June 1969, the earliest date for which the information is available on the basis of the Standard Industrial Classification (Revised 1968).

Footnotes to Table 4.

- (a) Some establishments employing fewer than 25 persons were included in returns for larger establishments. These amounted to 2 establishments in 1968 and 5 in 1963.
- (b) Including services rendered to other organisations (amounts charged for hiring out plant, machinery or other goods, for providing transport, or for technical or other services rendered).
- (c) Direct sales of goods (excluding canteen takings) made to, and work done for, the general public by larger establishments are included. These amounted to £13,000 in 1968. Similar information is not available for 1963.
- (d) This is the ratio of total sales of principal products by the industry to total sales of goods produced and work done.
- (e) Progress payments received for work in progress in 1968 from United Kingdom customers were recorded as £1,919,000 at the beginning of year and £1,236,000 at the end of year, and from overseas customers £59,000 at the beginning of year and £66,000 at end of year. Similar information is not available for 1963.
- (f) Administrative, technical and clerical employees.
- (g) Excluding expenditure for establishments not yet in production.

TABLE 4 Analysis of larger establishments, 1963 and 1968

Establishments employing 25 or more persons: Analysis of returns received, United Kingdom (a)

	Unit	1963	1968
Number of enterprises	No.	23	30
Number of establishments	"	49	46
Gross output	£'000	28,799	34,650
Net output	"	13,405	16,219
Net output per head	£	1,512	2,165
Sales and work done	{ goods produced and work done (b) (c) merchanted goods and canteen takings	£'000	
		27,790	33,919
		1,351	1,492
Index of specialisation (d)	Per cent.	77	86
Purchases	{ materials for processing and packaging, and fuel goods for merchenting and canteen purchases	£'000	
		13,404	15,959
		1,086	1,433
Payments to other organisations	{ for work done on materials given out for transport by road by rail and other means excluding postal services	"	
		714	1,707
		199	161
			30
Stocks and work in progress			
Goods on hand for sale	{ change during year at end of year	"	
		- 63	+ 307
		2,102	2,095
Work in progress (e)	{ change during year at end of year	"	
		- 278	- 1,067
		5,599	4,212
Materials, stores and fuel	{ change during year at end of year	"	
		+ 8	+ 858
		3,790	4,198
Number employed on average during the year	{ total, including working proprietors operatives other employees (f)	No.	
		8,867	7,491
		5,936	4,508
		2,924	2,967
Wages and salaries	{ of operatives of other employees (f)	£'000	
		4,910	4,960
		2,668	3,567
Wages and salaries per head	{ operatives other employees (f)	£	
		827	1,100
		913	1,202
Capital expenditure (g)			
New building work		£'000	
		216	79
Land and existing buildings	{ acquisitions disposals	"	
		24	74
		20	79
Plant and machinery	{ acquisitions disposals	"	
		430	621
		31	20
Vehicles	{ acquisitions disposals	"	
		115	227
		33	72

For notes to this table - see page 60/5.

TABLE 5 Sales of principal products of the industry by larger establishments, including sales by establishments classified to other industries, 1963 and 1968

Establishments employing 25 or more persons: Analysis of returns received, United Kingdom

	1963		1968		Enter-prises	Entries
	Quantity	Value	Quantity	Value		
	Number	£'000	Number	£'000	Number	Number
Refrigerating machinery (except domestic type refrigerators) (a)						
Commercial types, complete						
Ice cream conservators	16,802	920	36,078	2,232	8	9
Service cabinets, reach-in type	6,351	889	..	1,431	15	16
Food display cabinets and counters	{ 6,381 ..	{ 783 94	{ 17,876	{ 3,526	{ 17	{ 19
Beverage cooling cabinets	{ 9,388 ..	{ 490 197	{ 44,187	{ 2,103	{ 21	{ 21
Deep freeze and quick freeze units	{ 12,661 ..	{ 1,727 442	{ 17,376	{ 1,460	{ 17	{ 17
Other	{ ..	{ ..	{ 2,722 ..	{ 1,183 373	{ 21	{ 21
Condensing units, complete	..	3,143	..	5,296	14	18
Machinery for mechanical operation, prime mover exceeding 10 h.p. capacity	..	4,128	..	3,366	*	*
Other refrigerating machinery and parts for all types of refrigerating machinery (excluding domestic)	..	16,741(b)	..	14,491	61	68
Other products	..	40	..	39	*	*
Waste products						
Scrap metals	Th. tons					
Iron and steel	{ 2.2 ..	{ 15 3	{ ..	{ 12	{ 8	{ 8
Brass	0.2	21	..	6	*	*
Copper and other scrap metals	..	19	..	59	9	17
Work done: refrigerating machinery and plant erected and installed	..	3,787	..	5,357	6	7
Total		33,439		40,936	..	..
Sales in other industries (see Table 6)		11,918		11,605	..	..
Principal products of this industry sold by establishments in the industry		21,521		29,331	30	35(c)

(a) Domestic type refrigerators are included in the report on the Electric appliances primarily for domestic use industry (Part 78).

(b) Including parts of domestic type refrigerators for 1963.

(c) This figure represents the total number of returns made for larger establishments in this industry which is less than the total number of establishments shown in Table 4 on account of combined returns covering more than one establishment.

TABLE 6 Sales of principal products of the industry by larger establishments classified to other industries, 1963 and 1968

Establishments employing 25 or more persons:
Analysis of returns received, United Kingdom

	1963	1968		
	Value	Value	Entries	Principal industries in which produced (a)
Refrigerating machinery	£'000	£'000	Number	
Commercial types, complete	3,420	412	9	62,70,78,96
Beverage cooling cabinets				
Deep freeze and quick freeze units				
Other	2,472	16	64,78,97,151	
Condensing units, complete	1,288	1,606	8	56,61,77,78
Other refrigerating machinery and parts for all types of refrigerating machinery (excluding domestic)	7,210	6,221	50	(b)
Total	11,918	11,605	..	

(a) The references given are to the list of industries at the front of this report.

(b) Production is widely distributed.

TABLE 7 Sales of other than principal products by larger establishments in the industry, 1963 and 1968

Establishments employing 25 or more persons:
Analysis of returns received, United Kingdom

	1963	1968
	Value	Value
Space heating, ventilating and air-conditioning equipment, complete and parts	£'000	£'000
	623	647
Other products	3,503	1,697
Work done		
Building and civil engineering work carried out in Great Britain including the erection of constructional steelwork and the erection and installation of air-conditioning, heating and ventilating plant, but not of complete process plant (a)	63	225
Repair and jobbing work	1,944	2,010
Other work done	122	3
Services rendered to other organisations (b)	13	6
Total value of goods sold without having been subjected to any manufacturing process (merchanted or factored)	1,312	1,487
Canteen takings	39	4
Total	7,619	6,080

For notes to this table - see page 60/9.

TABLE 8 Production of certain principal products of the industry by larger establishments, 1963 and 1968

This table is not applicable to this industry.

TABLE 9 Purchases by larger establishments of selected principal products of the industry, 1968

This table is not applicable to this industry.

Footnotes to Table 7.

- (a) The data shown for 1963 is not comparable with that for 1968. Because of a change in the method of collection, the data for 1968 includes goods made by firms and incorporated in their building and civil engineering work whereas the data for 1963 excludes such goods. For 1963 the value of goods made and used in building and civil engineering work amounting to £320,000 has been deducted from the gross figure for building and civil engineering (£383,000) in order to avoid duplication which arises because they have been included against the appropriate sales headings elsewhere in the Report. For 1968 duplication does not arise since goods made and used in building and civil engineering work were not shown additionally as sales elsewhere in the Report; it is estimated that these goods amounted to £13,000.
- (b) Amounts charged for hiring out plant, machinery or other goods, for providing transport, or for technical or other services rendered to other organisations.

TABLE 10 Purchases by larger establishments in the industry, 1963 and 1968

Establishments employing 25 or more persons: Analysis of returns received, United Kingdom

	1963		1968	
	Quantity	Cost	Quantity	Cost
Materials for use in production	Th. tons	£'000	Th. tons	£'000
Iron castings	5.4	347	..	502
Steel	..	51	..	..
Bars and rods (including wire rods), angles, shapes and sections, girders, beams, joists and pillars rolled (not fabricated), including tube rounds and squares	..	350	2.8	213
Plates, 3mm. thick and over	2.4	215	..	106
Sheets under 3mm. thick (including electrical sheets)	1.2	100	4.9	537
Castings	..	9	..	56
Iron and steel not elsewhere specified except finished parts, wire and scrap	..	..	..	..
Wrought tubes and fittings for wrought tubes (including welded, seamless, conduits, etc)	..	337	3.4	593
Other	0.1	19	..	597
..	..	520	..	..
Springs, laminated and other types	..	18	..	17
Steel wire and wire manufactures (excluding insulated wires and cables)	..	..	..	..
Wire (single wire)	..	25	..	8
Light metals and non-ferrous metals in all forms except finished parts, wire and scrap	..	..	..	..
Aluminium and aluminium alloys	0.5	199	..	527
..	..	36	..	..
Brass and other copper alloys (including nickel silver and cupro nickel, but excluding all other nickel alloys and cadmium copper) (a)	0.6	184	..	329
..	..	65	..	..
Copper (including cadmium copper) (b)	0.8	341	1.4	1,022
Solder, soft	..	6	..	17
Glass in all forms (including finished parts)	..	57	..	103
General chemicals (c)	..	188	..	478
Paint and varnish (including lacquers and stains)	Th. gal.	..	..	..
..	17.7	26	..	53
..	..	6	..	..
Synthetic resins and plastics materials (excluding leathercloth and reinforced plastics)	..	44	..	371
Manufactures wholly or mainly of rubber (including synthetic rubber), balata and gutta-percha, including sheeting, but excluding replacement parts for firms' own machinery, plant, vehicles, etc	..	52	..	52
Timber	Th. stds.	..	Th. stds.	..
Softwood, sawn or planed but not further prepared or manufactured	0.2	22	1.5	192
..	..	27	..	..
Hardwood, sawn or planed, but not further prepared or manufactured	Th. cu. ft.	..	Th. cu. ft.	..
..	3.4	5	9.4	30
Plywood, including blockboard, laminboard and battenboard	Th. sq. ft.	..	Th. sq. ft.	..
..	72.1	4	587	105
..	..	94	..	..
Asbestos in all forms (including finished parts)	..	20	..	17
Other thermal insulating materials	..	429	..	400
Insulated wires, cables, strips and strands	..	24	..	71

TABLE 10 (continued)

	1963		1968	
	Quantity	Cost	Quantity	Cost
Materials for use in production (continued)		£'000		£'000
Bolts, rivets, nuts and washers, screws, nails, tacks, etc	..	104	..	105
Machinery and plant bought for installation and erection	..	1,793	..	1,229
Purchased components for incorporation in firms' own products	..	..	..	..
Ball and roller bearings and parts thereof	..	15	..	4
Electric motors	..	..	..	..
Of less than 1 h.p.	..	1,232	..	589
Of 1 h.p. and over	..	543	..	711
Industrial valves	..	292	..	488
Pumps	..	202	..	508
Measuring instruments and gauges and parts	..	..	..	..
Industrial process measuring and control instruments and equipment	..	304	..	352
Other	..	228	..	382
Plastic goods moulded and fabricated	..	10	..	69
Other components not elsewhere specified (excluding those of rubber and asbestos)	..	2,650	..	3,520
Lubricating oils and greases (including cutting oils and emulsions)	Th. gal.	..	..	..
..	126	29	..	42
..	..	56	..	..
Replacement parts for firms' own machinery, plant and vehicles, and accessories and consumable tools bought as replacement	..	..	..	..
Tyres and other spare parts for firms' own road goods vehicles	..	139	..	61
Other	..	..	..	82
All other materials for use in production	..	1,516	..	808
Packaging materials	..	..	..	..
Boxes, cartons, drums and canisters (with or without metal ends) of paper, cardboard and fibreboard	..	57	..	55
Timber	..	..	..	..
Containers wholly or mainly of wood (including plywood boxes and drums), baskets and wickerwork crates	..	21	..	50
Timber (sawn or planed) for manufacture into packing cases, etc	..	12	5.6	3
..	..	..	..	9
All other packaging materials	..	32	..	86
Fuel and electricity (d)	Th. tons	..	..	..
Coke (including screenings) and manufactured fuel	1.2	12	..	5
Derv fuel and motor spirit for use in road vehicles	Th. gal.	..	..	..
..	229	42	..	106
..	..	34	..	..
Other liquid fuels (including creosote/pitch mixtures, etc and liquefied petroleum gases)	Th. therms	..	..	..
..	450	20	..	35
..	..	34	..	..
Gas	Th. therms	..	..	..
..	358	29	..	39
..	..	13	..	..

Continued on next page.

TABLE 10 (continued)

	1963		1968	
	Quantity	Cost	Quantity	Cost
Fuel and electricity (d) (continued)	Th.kWh	£'000	Th.kWh	£'000
Electricity	3,298	29	18,641	186
	..	138		
All other fuels	..	(e)	..	37
Total cost of materials and fuel		13,404		15,959
Goods purchased for merchanting		1,045		1,415
Canteen purchases		41		18
Total cost of purchases		14,490		17,392

(a) For 1963 cadmium copper was not specifically excluded.

(b) For 1963 cadmium copper was not specifically included but blister was excluded.

(c) For 1963 described as 'Heavy chemicals'.

(d) There were no entries recorded for electricity generated in firms' own establishments in this industry in 1963 and 1968.

(e) Not recorded separately in 1963.

TABLE 11 Transport costs and employment of larger establishments, 1963 and 1968

Establishments employing 25 or more persons:
Analysis of returns received, United Kingdom

	Unit	1963	1968
Average number mainly employed on transport	No.	91	96
Transport costs			
Wages and salaries	£'000	70	109
Derv fuel and motor spirit	"	76	106
Tyres and other spare parts for road goods vehicles	"	..	61
Payments to other organisations for transport	"	199	161
	"		30
Costs of operating road goods vehicles			
Insurance	"	14	18
Vehicle licences	"	11	23
Depreciation	"	65	90
Payments to other organisations for repairs and maintenance	"	52	45
Total	"	488(a)	644

(a) Excluding tyres and other spare parts for road goods vehicles, not collected separately for 1963.

TABLE 12 Payments for certain services, etc by larger establishments, 1963 and 1968 (a)

Establishments employing 25 or more persons:
Analysis of returns received, United Kingdom

	Amounts payable	
	1963	1968
Repairs and maintenance to	£'000	£'000
Buildings	67	51
Road goods vehicles	52	45
Plant, machinery and other capital equipment	82	116
Insurance, licensing and depreciation of road goods vehicles (b)	91	132
Rates, excluding water rates	160	231
Hire of plant and machinery	52	13
Postage, telephone, telegrams, cables and telex (c)	135	167
Total	640	754

(a) No deduction is made for these payments to arrive at the figures of net output given in this report.

(b) For details see Table 11.

(c) Excluding telex for 1963.

TABLE 13 Percentage analysis of twelve-month periods covered by returns from larger establishments, 1968

Establishments employing 25 or more persons:
Analysis of returns received, United Kingdom

Year ended	Percentage of total returns received	Percentage of total number employed
1968	Per cent.	Per cent.
April (a)	0.0	0.0
May	0.0	0.0
June	2.9	0.5
July	0.0	0.0
August	0.0	0.0
September	22.8	53.3
October	8.6	9.3
November	0.0	0.0
December	28.5	23.5
1969		
January	8.6	2.3
February	5.7	1.5
March	22.9	9.6
April (b)	0.0	0.0
	100	100

(a) From 6 April.

(b) To 5 April.

TABLE 12. Comparison of the results of the two methods of determining the critical angle of incidence.

Material	Method 1	Method 2	Difference
Quartz	41.5	41.5	0.0
Calcite	24.5	24.5	0.0
Silica	33.5	33.5	0.0
Flint	38.5	38.5	0.0
Crystal	35.5	35.5	0.0
Glass	30.5	30.5	0.0
Acrylic	27.5	27.5	0.0
Polystyrene	25.5	25.5	0.0
PMMA	23.5	23.5	0.0
PC	21.5	21.5	0.0
PS	19.5	19.5	0.0
PVC	17.5	17.5	0.0
PE	15.5	15.5	0.0
PP	13.5	13.5	0.0
PTFE	11.5	11.5	0.0
SiO2	9.5	9.5	0.0
AlN	7.5	7.5	0.0
GaN	5.5	5.5	0.0
InP	3.5	3.5	0.0
AsP	1.5	1.5	0.0
BiP	0.5	0.5	0.0

TABLE 13. Comparison of the results of the two methods of determining the critical angle of incidence.

Material	Method 1	Method 2	Difference
Quartz	41.5	41.5	0.0
Calcite	24.5	24.5	0.0
Silica	33.5	33.5	0.0
Flint	38.5	38.5	0.0
Crystal	35.5	35.5	0.0
Glass	30.5	30.5	0.0
Acrylic	27.5	27.5	0.0
Polystyrene	25.5	25.5	0.0
PMMA	23.5	23.5	0.0
PC	21.5	21.5	0.0
PS	19.5	19.5	0.0
PVC	17.5	17.5	0.0
PE	15.5	15.5	0.0
PP	13.5	13.5	0.0
PTFE	11.5	11.5	0.0
SiO2	9.5	9.5	0.0
AlN	7.5	7.5	0.0
GaN	5.5	5.5	0.0
InP	3.5	3.5	0.0
AsP	1.5	1.5	0.0
BiP	0.5	0.5	0.0