



Metalica Ltd

Trends in Building Wire Use 1991-1998 in Europe

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Market Volume

In the following report we provide estimates for the amount of copper consumed in building wire and power cable used in building construction for the years 1991 to 1998. The figures represent sales of wire and cable by manufacturers (whether domestic or foreign). In Table 1 we show that in 1998 the general wiring market, thus specified, amounted to 742,000 tonnes copper weight in Western Europe

The general wiring market can usefully be divided between “building wire” and “power cable”. In this report we have attempted to distinguish between the two categories by classifying all products with a core size of 35 sq.mm. and above as “power cables”, all those below “building wire”. An alternative distinction would be between products rated at 1kV and above (power cable) and below 1kV (building wire). Taking our definition, we estimate that 45% of the market in Western Europe in terms of copper weight is accounted for by power cable, 55% by building wire. The apportionment between the two product groups varies relatively little by country, the share of copper power cable being lowest in France, where aluminium has a significant penetration in the industrial sector.

In the period 1991 to 1998, we estimate that general wiring consumption in Western Europe grew at an average rate of 1.7% p.a. The size of the market declined significantly in the years 1992 and 1993, in the context of falling construction activity. After rebounding strongly in 1994, the market achieved modest growth in the period 1994 to 1998, averaging 2.7% p.a. Market performance in 1998 was in line with recent history, with an estimated 2.4% growth.

The market trend varies substantially between countries. By far the strongest market is Spain, which achieved an average annual growth in market volume of 4.1% p.a. between 1991 and 1998. Spain achieved double-digit percentage growth in both 1997 and 1998. In contrast, France achieved zero average annual growth between 1991 and 1998. Germany saw a remarkable spurt in market volume in the early 1990s, driven mainly by reconstruction in the east of the country, but has since slipped back in size.

In 1998 we estimate the German general wiring market at 165,000 tonnes of copper, or 22% of the Western Europe total. The markets of France, Italy and the United Kingdom are roughly equivalent in size, at around 100,000 tonnes of copper each, or 13% of the regional total. Spain and Benelux are somewhat smaller as markets, taking around 60,000 tonnes each, or 8% of the regional total.

Intensity of Use

We compared Metalica data on general wiring use with building construction value data provided by Euroconstruct to derive intensity of use figures. The comparison indicates that, for Western Europe as a whole, approximately 1.18 kg of copper was consumed in general wiring for every thousand Euro of building construction in 1998 (measured in constant 1998 Euro). Our analysis suggests that the intensity of use of building wire is increasing, achieving an average annual rate of 1.1% between 1991 and 1998. Our figures suggest that rise in intensity of use was greatest in Germany (1.7% p.a.) and Spain (1.4% p.a.), lowest in the United Kingdom (0.3% p.a.) and Benelux (0.6% p.a.).

General Wiring Market Development and Intensity of Use 1991-1998

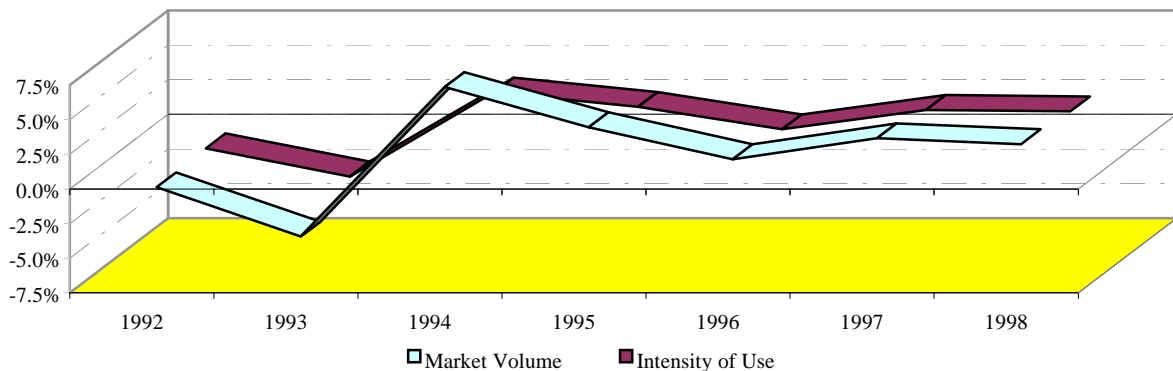
	1991	1992	1993	1994	1995	1996	1997	1998
Building Wire ('000t Cu)								
Benelux	27.6	27.6	25.1	25.7	27.7	28.5	30.4	31.5
France	61.0	60.0	52.5	57.0	59.5	57.5	57.5	60.0
Germany	72.5	78.5	75.5	86.0	95.0	91.0	91.0	88.9
Italy	48.0	49.0	46.0	46.0	49.6	51.4	51.0	52.0
Spain	25.0	25.0	22.0	21.8	23.0	24.2	27.5	30.0
UK	51.8	47.8	47.0	50.2	48.6	51.0	53.5	55.3
Other W.Europe	80.2	75.2	74.2	77.1	78.6	82.8	86.4	89.9
W.Europe	366.1	363.1	342.3	363.7	382.0	386.4	397.3	407.5
% Change	<i>na</i>	-0.8%	-5.7%	6.3%	5.0%	1.2%	2.8%	2.6%
Power Cable ('000t Cu)								
Benelux	23.8	24.3	23.5	24.2	24.8	24.5	26.0	26.7
France	39.0	39.0	34.5	36.0	37.5	37.5	37.5	38.7
Germany	61.5	67.5	67.0	76.0	81.0	78.0	78.0	76.1
Italy	46.0	46.5	45.0	45.0	46.4	47.6	47.5	48.0
Spain	22.0	22.2	21.0	22.0	23.5	25.0	27.7	31.4
UK	40.5	37.3	36.9	39.3	38.1	39.7	41.7	42.9
Other W.Europe	63.1	57.7	56.9	59.6	62.1	65.9	69.0	70.9
W.Europe	295.9	294.5	284.7	302.1	313.3	318.2	327.4	334.8
% Change	<i>na</i>	-0.5%	-3.3%	6.1%	3.7%	1.5%	2.9%	2.3%
General Wiring Total ('000t Cu)								
Benelux	51.4	51.8	48.6	49.8	52.5	52.9	56.4	58.2
France	100.0	99.0	87.0	93.0	97.0	95.0	95.0	98.7
Germany	134.0	146.0	145.0	167.0	176.0	169.0	169.0	165.0
Italy	94.0	95.5	91.0	91.0	96.0	99.0	98.5	100.0
Spain	47.0	47.2	43.0	43.8	46.5	49.2	55.2	61.4
UK	92.3	85.1	83.8	89.5	86.7	90.7	95.2	98.2
Other W.Europe	143.3	132.9	131.1	136.7	140.7	148.7	155.4	160.8
W.Europe	662.1	657.5	629.5	670.8	695.3	704.6	724.7	742.3
% Change	<i>na</i>	-0.7%	-4.3%	6.6%	3.7%	1.3%	2.9%	2.4%
Building Construction Value (1998 Euro billion)								
Benelux	47.0	47.3	45.5	46.2	46.9	47.1	49.9	50.9
France	89.1	86.7	81.1	81.2	82.4	79.9	78.7	80.7
Germany	150.0	164.4	166.2	179.1	181.2	176.7	172.8	165.0
Italy	82.1	82.7	79.8	77.4	78.5	80.0	79.5	80.5
Spain	32.7	32.1	30.3	31.8	33.6	34.9	36.8	39.1
UK	74.0	70.0	68.4	72.4	72.2	73.4	75.3	77.0
Other W.Europe	94.5	89.3	85.7	88.4	89.1	92.9	96.5	99.6
W.Europe	569.5	572.4	557.0	576.5	584.0	584.9	589.5	592.8
% Change	<i>na</i>	0.5%	-2.7%	3.5%	1.3%	0.2%	0.8%	0.6%
Intensity of Use of General Wiring (kg Cu per Euro '000 Building Construction)								
Benelux	1.095	1.097	1.070	1.078	1.118	1.124	1.131	1.143
France	1.123	1.142	1.072	1.145	1.177	1.189	1.207	1.223
Germany	0.893	0.888	0.872	0.932	0.971	0.956	0.978	1.000
Italy	1.144	1.155	1.141	1.175	1.222	1.238	1.239	1.242
Spain	1.435	1.470	1.419	1.378	1.383	1.410	1.500	1.570
UK	1.248	1.215	1.226	1.237	1.201	1.236	1.264	1.275
Other W.Europe	1.516	1.489	1.529	1.546	1.579	1.601	1.610	1.614
W.Europe	1.092	1.086	1.058	1.094	1.121	1.130	1.155	1.179
% Change	<i>na</i>	-0.6%	-2.6%	3.5%	2.4%	0.8%	2.2%	2.1%

Note: Other W.Europe construction data excludes Ireland, Norway and Former Yugoslavia. Intensity of use data for W.Europe relates to all countries excluding Other W.Europe.

Source: Metalica, on behalf of the European Copper Institute / International Copper Association

Although there is clearly a match between construction activity and general wiring use, the statistical relationship is not a simple one. Part of the problem is in the statistics themselves. The Euroconstruct database is intended to represent the value of construction actually put in place in each year, but the degree to which individual countries adhere to this rule varies. Contact value, measured at the beginning of a construction project, is sometimes used. For the purpose of measuring wire use intensity, the amount of construction completed is most useful, as most wire is installed late in the construction cycle.

Annual Change in Market Volume and Intensity of Use In Western Europe 1991-1998



Source: Metalica, on behalf of the European Copper Institute / International Copper Association

Another statistical problem emerges from inaccuracies in the recording of construction work. A large amount of renovation work does not require a permit and as a result is unlikely to be recorded. Much more renovation and some new building that should have a permit in fact does not, Euroconstruct does include an estimate for DIY and “Black Economy” construction work in its figures, but it appears that in most instances the figure allotted is far too low. If the proportion of non-recorded work were fixed it would not affect our intensity of use trend analysis that much, Unfortunately, the differences are large. Also, the absolute value of construction work in different countries is not the same. A given Euro value of new building cannot simply be translated into a fixed number of square metres of construction.

As a result of these differences, the intensity of use of wire in Spain (for example) appears to be much lower than that in Germany (1.57 kg per thousand Euro of construction in 1998 compared to 1.00 kg), where we know the reverse to be true (in terms of wire use per given floorspace in comparable buildings).

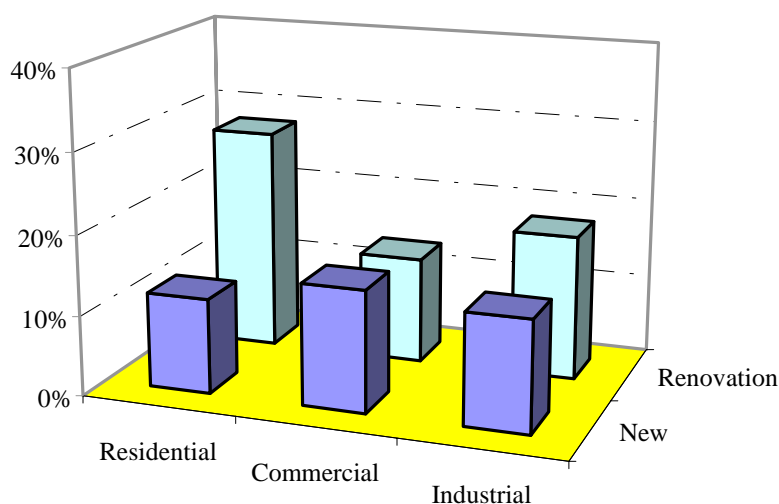
Apparent differences in the intensity of use of general wiring also emerge from the stocking and de-stocking cycle. In the chart above and table opposite it can be seen quite clearly that the intensity of use of general wiring appears to perform badly in years of a static or declining construction market (1992 and 1993), but performs exceptionally well in years of rapid growth (1994). This result emerges from the fact that we are measuring the market at the point of first sale, rather than in end-use. Typically, supply chain stocks are built up during periods of accelerating market growth and run down as the rate of growth slows. On top of this, stocks tend to be built up in periods of rising copper prices and to be drawn down as prices fall, but also to be kept relatively low when cable prices are high and vice versa.

General Wiring Use by Construction Segment in Western Europe in 1998

	Residential	Commercial	Industrial	Total
<i>000t Copper</i>				
New	87.9	112.3	102.9	303.1
Renovation	206.3	98.7	134.2	439.2
Total	294.2	211.0	237.1	742.3
<i>% Share</i>				
New	11.8%	15.1%	13.9%	40.8%
Renovation	27.8%	13.3%	18.1%	59.2%
Total	39.6%	28.4%	31.9%	100.0%

Source: Metalica, on behalf of the European Copper Institute / International Copper Association

General Wiring Use by Construction Segment in Western Europe in 1998



Source: Metalica, on behalf of the European Copper Institute / International Copper Association

Taking these actors into account, it is useful to compare the years 1994 and 1996. In 1994 the level of building construction was high (3.5%) p.a. and rising. Also copper prices were increasing rapidly. In 1996 the building construction market was slowing (recording a 0.8% gain) while copper prices were falling. In both years the absolute level of cable pricing was not exceptional and probably had little influence on the level of stock. In this context, it is not surprising that we record a very high level of growth in the apparent consumption of general wiring in 1994 (6.6%) and a low growth rate in 1996 (1.3%). It should be remembered that for every one week's consumption volume change in supply chain stocks, there is an apparent 2% change in market volume that occurs independently of any real change in end market volume.

With a tendency for the construction market to slow between 1994 and 1998 and for copper prices to fall, the overall level stocks is likely to have fallen, a fact which may lead us to underestimate the true rate of growth in the general wiring market.

Market Segmentation

Although useful, a simple comparison between the value of construction and general wiring use does not necessarily give us an accurate picture of real developments in intensity of use. Changes in the composition of construction greatly affect the amount of wire needed. Ideally, it would be useful to know the extent to which copper in wire use changed over time and between countries for buildings of an exactly equivalent type. Although it is possible to come up with anecdotal evidence of this type, it is necessary to simplify our analysis in practice. We have applied the six cell matrix segmentation indicated in Table 2.2 and Chart 2.2, apportioning the market between new and renovation work and between residential, commercial and industrial building. As well as being useful analytically, the six segments have very different characteristics as far as the marketing and distribution of wire and cable are concerned, so should be of great interest both to cablemakers and wholesalers and distributors.

Our analysis suggests that for Western Europe., renovation is rather more important than new building, taking an estimated 59% of the market. By building type, the residential sector is the most important, with an estimated 40% market share. Commercial and industrial building follow with 28% and 32% shares respectively. The residential sector is more heavily biased towards renovation work than either commercial or industrial building.

There are large differences in the six-cell market segmentation between the countries of Western Europe. Spain, which has relatively few buildings suitable for renovation, shows a much stronger emphasis on renovation work than the other main national markets. In this case, renovation accounts for an estimated 44% general wiring market share. This compares with countries such as the Netherlands, France and Italy with a more mature stock of buildings, where 65-70% of general wiring is used in renovation.

Far bigger differences exist between Western and Central Europe. With the need to replace much of the existing stock of buildings, new building takes on a particularly important role in Central Europe, with an estimated 64% market share. Here, industrial building rather than residential or commercial building takes on a predominant role.

The six end use market segments demonstrate large differences in the apparent intensity of use of general wiring. For the main specified countries of Western Europe (excluding “Other Western Europe”), renovation work records an intensity of use 1.72 times higher than new building in 1998 (1.53 kg per thousand Euro of construction compared to 0.89 kg). At the same time, nonresidential building records an intensity of use 2.24 times higher than residential building (1.77 kg per thousand Euro of construction compared to 0.79 kg). Although the difference in part reflects an under-recording of renovation and residential work, it also shows that the composition of construction activity is a critical determinant in deciding the level of general wiring use.

Drivers of Change

Changes in the structure of building construction activity over time affect the level of general wiring demand independently of any change driven by developments in wiring practice. At the beginning of the 1990s, Euroconstruct statistics show that nonresidential construction was far more important as a proportion of the total than it has been in the recent past, while renovation was only slightly less important. We have adjusted Euroconstruct figures to include Black Economy/DIY work within the main categories of building construction on a

fixed percentage allocation. This procedure allows us to estimate the distribution of construction activity for the main countries of Western Europe in 1991 as follows: 27.2% residential new building, 31.6% residential renovation, 24.6% nonresidential new building, 16.6% nonresidential renovation. For 1998, the comparable figures are: 29.3% residential new building, 32.7% residential renovation, 21.2% nonresidential new building, 16.8% nonresidential renovation. If the intensity of use recorded in 1998 for each individual market segment also applied in 1991, the change in the composition of construction alone would have led to a fall in general wiring use of 1.7%.

It appears, therefore, that the improvement in intensity of use of general wiring between 1991 and 1998 averaged 1.3% p.a. not 1.1% p.a., if the composition of construction activity is taken into account. The difference, however, relates purely to the early years of the decade. Indeed, if the trend in building composition between 1994 and 1998 is used as a benchmark, we would expect to see a 1.0% increase in general wiring use independently of any change in wiring practice. The intensity of use of general wiring shown by looking at total construction rather than its segment-by-segment apportionment, therefore, is slightly higher than a more detailed analysis would suggest. Changes in the construction industry itself have contributed towards the market increase.

However one measures the intensity of use of general wiring, it is obvious that the market is on an increasing trend, with more copper per given unit area or value of construction in any given group of equivalent building types. It is also clear that the process is a slow one, and opinions vary as to where the increase has come from. A few points are clear:

- The greatest increase in intensity of use results from a rise in the length of wire sold, mainly of small and very small core sizes. This results from an increase in the number of standard circuits and a greater use of dedicated circuits. A requirement for a greater density of socket outlets and lighting points coupled with a growing density of electrical and electronic equipment in the home, office and factory all contribute towards this trend. In general, this means a growth in the use of 1.5 sq.mm., 2.5 sq.mm. and, to a lesser extent, 4 sq.mm. wires.
- There is a fairly strong growth in communication and alarm wiring, especially in the residential sector. This generally means the use of 1 sq.mm. wire or less.
- Fine wires are also gaining ground in the more sophisticated markets of northern Europe through “emotics” (in industrial buildings) and “demotics” (in the residential sector). Both terms refer to the process of remote control of electrical functions through a system of fine message-carrying wires. While there is a plus side to this development, it does mean the loss of some larger control cables used in the industrial market, where the net effect of emotics is probably negative.
- Improved earthing is common to most national markets, where an adequate or more than adequate earthing system is recognised as a facet of good electrical installation practice, alongside the use of a greater number of circuits.
- It is less common for there to be a recognition that there is any great benefit in increasing conductor or neutral sizes. The practice of using undersized neutrals is slowly declining, even in Spain, while in a few circumstances neutrals can be larger than phase conductors (especially in the United Kingdom). The practice of using 1 sq.mm. in place of 1.5 sq.mm. wire in

lighting and 1.5 sq.mm. or 2 sq.mm. wire in place of 2.5 sq.mm. wire in final circuitry is also declining.

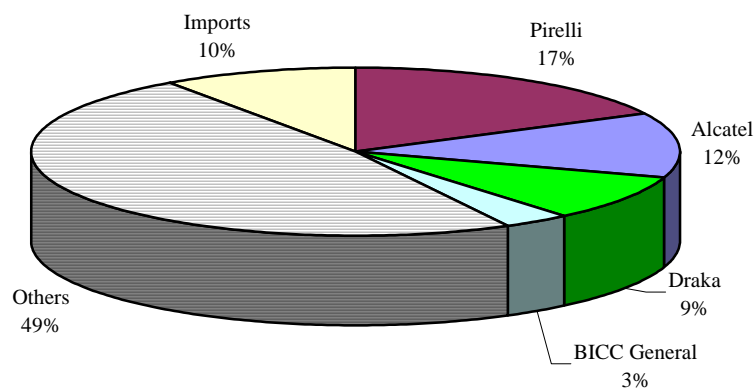
- There is little evidence of 5-core cable gaining much ground, with the possible exceptions of Germany, the United Kingdom and the Netherlands.
- Aluminium has a very small share of the general wiring market. Its share is thought to be insignificant except in France (where it claims 4-5,000 tonnes of the market) and Spain (1-2,000 tonnes). In France and Spain aluminium use appears to be stable, while elsewhere it is declining.

Market Share

Europe's wire and cable industry has been consolidating in recent years. Although the large companies focus most on higher value added products, they have built up a considerable share in the lower-end general wiring business. Pirelli and Draka have expanded greatly in their market presence in recent years, both with a manufacturing presence in most of the countries of Western Europe. Pirelli now has an estimated 17% share of the general wiring market, Draka has 9%.

The other main contender for market leadership is Alcatel, with an estimated 12% share. Alcatel built up a very large market presence through acquisition in the late 1980s and early 1990s, but has slipped behind Pirelli. Another former market leader, BICC, is now nowhere to be seen. It steadily withdrew from the wire and cable business in 1998 and 1999, selling its remaining energy cable operation to General Cable of the United States earlier this year. The rump of BICC's general wiring business, now mostly in the hands of BICC General of Spain, accounts for around 3% of the total Western European market. Of the remaining 59% of the business, 49% is accounted for by other companies within Western Europe (many of which individually have a 1-2% share), and 10% by net imports from outside the region.

General Wiring Market Shares in Western Europe in 1998



Note: Shares are based on current company alignments, taking into account acquisitions in 1998 and 1999.

Source: Metalica, on behalf of the European Copper Institute / International Copper Association

