






Copper Cabling Categories	
<p>Category 5e</p> 	<p>Since Cat5e superseded Cat5 in 1999, it has been the baseline structured cabling system. It is still adequate for most current installations, supporting 10BaseT, 100BaseT and 1000BaseT. However, it will not support the emerging 10GBaseT Ethernet and should therefore only be installed where there will be no requirement to support 10GBaseT during the lifetime of the cabling system.</p>
<p>Category 6</p> 	<p>Cat6 has been the enterprise cabling system of choice for many years. Although only designed to run the same Ethernet protocols as Cat5e, it is a higher performance system, supporting more than double the frequency and running to a tighter specification. This gives it significant performance headroom to support the faster protocols like 1000BaseT and is therefore considered more reliable than Cat5e.</p> <p>A properly installed Cat6 system will potentially run 10GBaseT over lengths of up to between 30 and 45 metres. However, this is not guaranteed and may depend on the installation being 'tweaked' to pass.</p> <p>More than 95% of Cat5e and Cat6 installations in the UK are unshielded (U/UTP) which are easier to install and maintain than shielded systems.</p>
<p>Category 6a</p> 	<p>Cat6a is the newest ISO cabling standard, designed to meet all of the requirements of 10GBaseT over the full 100 meters channel length. It is therefore an attractive solution when there is a requirement for future proofing the installation for five or more years. It is especially suitable for data centres, where the higher bandwidths are likely to be used at the earliest opportunity and in backbone links of less than 100m.</p> <p>In order to achieve the high performance, the Cat6a system is specified to run at frequencies of up to 500MHz, which imposes serious constraints on its design in terms of the cable size (it can be a hefty cable) and connector separations. For this reason, many manufacturers are recommending shielded solutions over unshielded, where it is easier for the manufacturer to guarantee meeting the standards.</p>
<p>Category 7</p> 	<p>Cat7 is a very high performance system, specified to run at frequencies up to 600MHz. It is mandatory that Cat7 systems are shielded, with both the individual cables and the overall cables being screened (S/FTP).</p> <p>Cat7 has been around as long as Cat6, but until recently was only popular in Germany and some other European countries, where shielded solutions are required to meet the local electromagnetic regulations. However, with the development of 10GBaseT, which Cat7 fully supports, Cat7 is becoming a viable alternative to a Cat6a solution in countries like UK.</p> <p>A downside of Cat7 is its use of non standard connectors (i.e. not RJ-45).</p>
<p>Category 7a</p> 	<p>Cat7a is currently being developed as an enhancement to Cat7, the main difference being that Cat7a will be designed to support higher frequencies of up to 1GHz. This will allow Cat7a to support RF applications currently only supported by coaxial cables. Hence the same cable will be able to support either data or broadband video applications.</p>

Category Comparison Table							
System Category		Cat5e	Cat6	Cat6a	Cat7	Cat7a	
Standards	Year Ratified	1999	2002	2008	2002	2008	
	ISO/EN	Class D	Class E	Class E _A	Class F	Class F _A	
	TIA	TIA-568-B.2	TIA-568-B.2-1	TIA-568-B.2-10	-	-	
Performance	Max Frequency	100MHz	250MHz	500MHz	600MHz	1GHz	
	Design Bandwidth	1Gbit	1Gbit	10Gbit	10Gbit	40Gbit	
Physical	Cable	4-pair	4-pair	4-pair	4-pair	4-pair	
	Standard Connector	RJ-45	RJ-45	RJ-45	GG-45 or TERA	GG-45 or TERA	
	¹ Max Connections	4	4	4	4	4	
	² Max Chan Length	100m	100m	100m	100m	100m	
Ethernet Protocols Supported	10BaseT	✓	✓	✓	✓	✓	
	100BaseT	✓	✓	✓	✓	✓	
	1000BaseT	✓	✓	✓	✓	✓	
	10GBaseT	-	³ Up to 55m	✓	✓	✓	
Backwards ⁴ Compatibility		Cat5	Cat5/5e	Cat5/5e/6	-	Cat7	
Cable Size	Diameter	UTP	5 mm	6 mm	8.5 mm	-	-
		Shield	6 mm	7 mm	7.5 mm	8 mm	TBA
	Tray Capacity ⁵ 150mm x 50mm	UTP	191	132	66	-	-
		Shield	132	97	85	75	TBA
2009 Installations	Market Share	30%	58%	10%	2%	-	
	Ratio: UTP/Shield	95% / 5%	95% / 5%	33% / 67%	- / 100%	- / 100%	
Relative Install Cost (approximate)		1.00	1.25	1.50	2.00	2.50	

¹The number of connections excludes the two end points where the patch/fly lead plugs into the equipment.

²A maximum channel length of 100m is usually stated as maximum fixed link length of 90m, leaving 10m for patch leads.

³Cat6 may support 10GBaseT for lengths up to a maximum of between 30m and 55m, depending on installation factors.

⁴A link of mixed components will perform to the standard of the lowest performance component.

⁵Based on 50% fill as per the TIA-569 design guidelines.