ES-88-D: FINISH SPECIFICATION - GOLD

1.0 SCOPE
This specification defines the requirements for all GOLD finishes on metallic surfaces.

2.0 PURPOSE
To define the standard finish characteristics and finish codes along with their minimum and maximum layer requirements.

3.0 REFERENCE DOCUMENTS
ES-88 Molex Finish Specification

4.0 DEFINITIONS

4.1 Finish Specification Codes

4.1.1 Hard Gold over Nickel Overall

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	OVERALL HARD GOLD MIN µin (µm) MAX µin (µm)	OVERALL NICKEL MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		504	2(0.05) 10(0.25)	50(1.27)	
		511	2(0.05) 10(0.25)	80(2.03)	
		512	15(0.38)	50(1.27)	
		514	2(0.05) 10(0.25)	40(1.02)	
		515	4(0.10)	80(2.03) 128(3.25)	
		516	10(0.25)	30(0.76)	
		517	10(0.25)	80(2.03) 128(3.25)	
		518	8(0.20)	40(1.02)	
		519	12(0.31)	80(2.03) 128(3.25)	
		531	15(0.38)	30(0.76)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	10µ" (0.25µm)
	Batch plating	20µ" (0.51µm)
Nickel	Continuous plating	50µ" (1.27µm)
	Batch plating	50µ" (1.27µm)

4.1.1 Hard Gold over Nickel Overall (Continued …..)

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	OVERALL HARD GOLD MIN µin (µm) MAX µin (µm)	OVERALL NICKEL MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		501	20(0.51)	30(0.76)	
		502	20(0.51)	50(1.27)	
		503	30(0.76)	50(1.27)	
		505	50(1.27)	50(1.27)	
		506	50(1.27)	100(2.54)	
		507	100(2.54)	50(1.27)	
		508	30(0.76)	30(0.76)	
		509	50(1.27)	30(0.76)	
		520	15(0.38)	80(2.03) 128(3.25)	
		521	20(0.51)	80(2.03) 128(3.25)	
		522	30(0.76)	80(2.03) 128(3.25)	
		523	40(1.02)	80(2.03) 128(3.25)	
		524	51(1.30)	80(2.03) 128(3.25)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	10µ” (0.25µm)
	Batch plating	20µ” (0.51µm)
Nickel	Continuous plating	50µ” (1.27µm)
	Batch plating	50µ” (1.27µm)

4.1.2 Selective Hard Gold over Nickel Overall (without Selective Hard Gold Flash)

Note: Hard Gold in the Critical Contact area only

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	SELECT HARD GOLD MIN µin (µm) MAX µin (µm)	OVERALL NICKEL MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		553	25(0.64)	50(1.27)	
		554	15(0.38)	50(1.27)	
		555	15(0.38)	30(0.76)	
		556	4(0.10)	40(1.02)	
		559	15(0.38)	100(2.54)	
		560	10(0.25)	40(1.02)	
		561	30(0.76)	50(1.27)	
		562	20(0.51)	30(0.76)	
		607	50(1.27)	50(1.27)	
		621	14(0.36)	40(1.02)	
		622	30(0.76)	40(1.02)	
		623	50(1.27)	40(1.02)	
		670	30(0.75) 40(1.00)	150(3.75) 200(5.00)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	10µ” (0.25µm)
	Batch plating	20µ” (0.51µm)
Nickel	Continuous plating	50µ” (1.27µm)
	Batch plating	50µ” (1.27µm)

4.1.3 Selective Hard Gold (over Nickel Overall) with Overall Hard Gold Flash

Note: Hard Gold Flash provides a uniform appearance to the part with the thicker Hard Gold in the Critical Contact area

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	OVERALL HARD GOLD FLASH MIN µin (µm) MAX µin (µm)	SELECT HARD GOLD MIN µin (µm) MAX µin (µm)	OVERALL NICKEL MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		550	2(0.05) 10(0.25)	15(0.38)	30(0.76)	
		551	2(0.05) 10(0.25)	25(0.64)	50(1.27)	
		557	2(0.05) 10(0.25)	15(0.38)	50(1.27)	
		558	2(0.05) 10(0.25)	30(0.76)	50(1.27)	
		565	2(0.05) 10(0.25)	20(0.51)	30(0.76)	
		591	2(0.05) 10(0.25)	50(1.27)	50(1.27)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	10µ” (0.25µm)
	Batch plating	20µ” (0.51µm)
Nickel	Continuous plating	50µ” (1.27µm)
	Batch plating	50µ” (1.27µm)

4.1.4 Selective Hard Gold over Nickel Overall

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	SELECT HARD GOLD MIN µin (µm) MAX µin (µm)	SELECT HARD GOLD MIN µin (µm) MAX µin (µm)	OVERALL NICKEL MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		609	2(0.05) 10(0.25)	15(0.38)	50(1.27)	
		610	2(0.05) 10(0.25)	30(0.76)	50(1.27)	
		611	15(0.38)	50(1.27)	50(1.27)	
		614	2(0.05) 10(0.25)	14(0.36)	40(1.02)	
		615	30(0.76)	150(3.81)	75(1.91)	
		616	30(0.76)	75(1.91)	75(1.91)	
		617	8(0.20)	40(1.02)	50(1.27)	
		618	2(0.05) 10(0.25)	5(0.13)	50(1.27)	
		619	30(0.76)	40(1.02)	50(1.27)	
		620	30(0.76)	75(1.91)	50(1.27)	
		624	8(0.20)	30(0.76)	50(1.27)	
		625	8(0.20)	15(0.38)	50(1.27)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	10µ” (0.25µm)
	Batch plating	20µ” (0.51µm)
Nickel	Continuous plating	50µ” (1.27µm)
	Batch plating	50µ” (1.27µm)

4.1.5 Hard Gold over Copper Overall

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	OVERALL HARD GOLD MIN µin (µm) MAX µin (µm)	OVERALL COPPER MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		627	10(0.25) 30(0.76)	100(2.54) 200(5.08)	
		628	100(2.54) 150(3.81)	100(2.54) 200(5.08)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	10µ" (0.25µm)
	Batch plating	20µ" (0.51µm)
Copper	Continuous plating	50µ" (1.27µm)
	Batch plating	100µ" (2.54µm)

4.1.6 Hard Gold over Nickel over Copper Overall

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	OVERALL HARD GOLD MIN µin (µm) MAX µin (µm)	OVERALL NICKEL MIN µin (µm) MAX µin (µm)	OVERALL COPPER MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		626	100(2.54) 150(3.81)	50(1.27) 100(2.54)	100(2.54) 200(5.08)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	10µ" (0.25µm)
	Batch plating	20µ" (0.51µm)
Nickel	Continuous plating	50µ" (1.27µm)
	Batch plating	50µ" (1.27µm)
Copper	Continuous plating	50µ" (1.27µm)
	Batch plating	100µ" (2.54µm)

4.1.7 Hard Gold Only

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	OVERALL HARD GOLD MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		629	8(0.20)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	10µ" (0.25µm)
	Batch plating	20µ" (0.51µm)

4.1.8 Selective Hard Gold over Selective Nickel over Nickel Overall

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	SELECT HARD GOLD MIN µin (µm) MAX µin (µm)	SELECT NICKEL MIN µin (µm) MAX µin (µm)	OVERALL NICKEL MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		513	15(0.38)	50(1.27)	8(0.20)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	50µ" (1.27µm)
	Batch plating	50µ" (1.27µm)
Nickel	Continuous plating	10µ" (0.25µm)
	Batch plating	20µ" (0.51µm)

4.1.9 Selective Extra Hard Gold over Nickel Overall

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	SELECT EXTRA HARD GOLD MIN µin (µm) MAX µin (µm)	OVERALL NICKEL MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		600	30(0.76) 40(1.02)	150(3.81)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	50µ" (1.27µm)
	Batch plating	50µ" (1.27µm)
Nickel	Continuous plating	10µ" (0.25µm)
	Batch plating	20µ" (0.51µm)

4.1.10 Selective Extra Hard Gold over Selective Nickel

Note: See ES-88 for specific material properties, quality, packaging, etc. details.
Conversion factor 1µm = 39.37µin

PROCESS CODE	APPEARANCE CODES	FINISH CODE	SELECT EXTRA HARD GOLD MIN µin (µm) MAX µin (µm)	SELECT NICKEL MIN µin (µm) MAX µin (µm)	OBSOLETE/ RECOMMENDED
		533	30(0.76) 40(1.02)	150(3.81)	

UNLESS OTHERWISE SPECIFIED MAXIMUM FINISH THICKNESS ALLOWED ABOVE MINIMUMS:

Continuous and Batch Plating:

Gold	Continuous plating	50µ" (1.27µm)
	Batch plating	50µ" (1.27µm)
Nickel	Continuous plating	10µ" (0.25µm)
	Batch plating	20µ" (0.51µm)