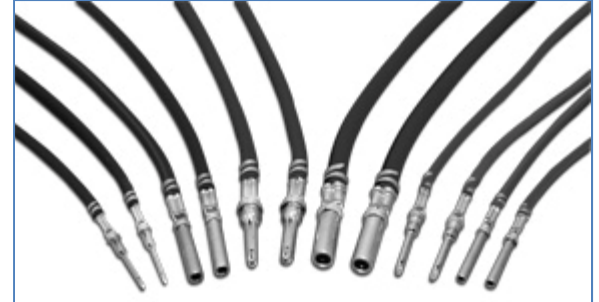# DELPHI

Delphi Harsh Environment Series (HES) Terminals

The Delphi Harsh Environment Series (HES) terminals are designed for application in all industry standard terminal cavity sizes and for performance in harsh environments which include commercial vehicles, construction, agriculture equipment and other specialty vehicles. They are available in three sizes:

- 1.0 mm (size 20)
- 1.6 mm (size 16)
- 2.4 mm (size 12)

Because HES terminals provide excellent performance and value, they are an optimal choice when selecting a standard cavity terminal. The HES terminals provide numerous advantages compared to industry standard terminals.

Delphi Harsh Environment Series Terminals

▶ Benefits

- Contact (terminal) performance
    - o Higher current ratings compared to existing systems
    - o Stainless steel sleeve provides stability and protection to contact interface area
    - o Overlapping wing design provides exceptional strain relief and larger outside diameter cable range capability
    - o Tin in crimp area results in superior crimp stability over life
    - o Crimps designed to accommodate a wide range of cable sizes
- Terminal design improves insertion force
- Validated to SAE J2030 and various other customer specifications

▶ Typical Applications

Delphi Harsh Environment Series terminals are designed for use in the following industries:

- Agriculture
- Commercial vehicle
- Construction
- Marine
- Other harsh environment applications

They are well suited for use in harsh environment pass-through applications where space is limited. They can be tailored to meet individual customer specifications.
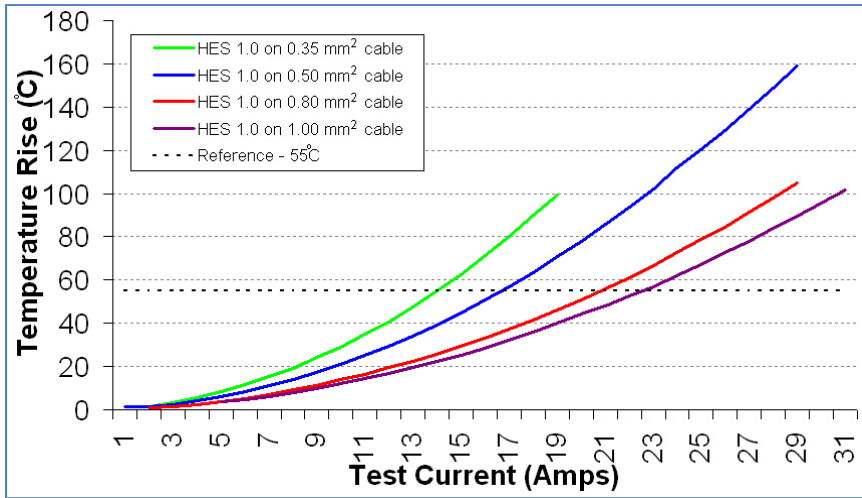

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▶ Terminal Current Capacity and Wire Size

Contact Size	Wire Gauge AWG (mm^2)	Current (Amps)
20	22 Ga. (0.35 mm^2)	10
	20 Ga. (0.50 mm^2)	14
	18 Ga. (0.80 mm^2)	16
	16 Ga. (1.0 mm^2)	18
16	20 Ga. (0.50 mm^2)	14
	18 Ga. (0.80 mm^2)	18
	16 Ga. (1.0 mm^2)	22
	14 Ga. (2.0 mm^2)	24
	12 Ga. (3.0 mm^2)	28
12	14 Ga. (2.0 mm^2)	24
	12 Ga. (3.0 mm^2)	30
	4.0 mm^2	30
	10 Ga. (5.0 mm^2)	40

▶ HES Terminal Application Reference Table

HES Part Number		Terminal Size	Terminal Type	Wire Gage Size (mm^2)	Insulation Type	Cable Outside Diameter Range (mm)
Nickel (Ni)	**Gold (Au)**					
13711546	13711547	1.0 mm	F	0.35 - 0.50	TXL	1.25 - 1.80
13654421	13654422		F	0.35 - 0.50	G/SXL	1.80 - 2.51
13711548	13711549		F	0.75 - 1.00	TXL	1.60 - 2.25
13663727	13663728		F	0.75 - 1.00	G/SXL	2.05 - 2.78
13711542	13711543		M	0.35 - 0.50	TXL	1.25 - 1.80
13654423	13654424		M	0.35 - 0.50	G/SXL	1.80 - 2.51
13711544	13711545		M	0.75 - 1.00	TXL	1.60 - 2.25
13663723	13663724		M	0.75 - 1.00	G/SXL	2.05 - 2.78
13697414	13697417	1.6 mm	F	0.50 - 0.80	TXL	1.40 - 2.15
13663718	13690835		F	0.50 - 0.80	G/SXL	2.20 - 2.78
13697415	13697418		F	1.00 - 1.50	TXL	1.80 - 2.45
13663719	13690836		F	1.00 - 1.50	G/SXL	2.40 - 3.00
13697416	13697419		F	2.00 - 3.00	TXL	2.40 - 3.31
13663720	13690837		F	2.00 - 3.00	G/SXL	2.89 - 3.67
13697408	13697411		M	0.50 - 0.80	TXL	1.40 - 2.15
13663715	13690838		M	0.50 - 0.80	G/SXL	2.20 - 2.78
13697409	13697412		M	1.00 - 1.50	TXL	1.80 - 2.45
13663716	13690839		M	1.00 - 1.50	G/SXL	2.40 - 3.00
13697410	13697413		M	2.00 - 3.00	TXL	2.40 - 3.31
13663717	13690840		M	2.00 - 3.00	G/SXL	2.89 - 3.67
13783287	13783295	2.4 mm	F	0.75 - 1.00	TXL	1.60 - 2.25
13783288	13783296		F	0.75 - 1.00	G/SXL	2.20 - 3.10
13783289	13783297		F	1.50 - 2.50	TXL	2.10 - 3.00
13783290	13783298		F	1.50 - 2.50	G/SXL	2.60 - 3.70
13783291	13783299		F	2.00 - 3.00	TXL	2.40 - 3.35
13783292	13783300		F	2.00 - 3.00	G/SXL	2.89 - 4.21
13783293	13783301		F	4.00 - 6.00	TXL	3.40 - 4.80
13783263	13783273		M	0.75 - 1.00	TXL	1.60 - 2.25
13783264	13783276		M	0.75 - 1.00	G/SXL	2.20 - 3.10
13783265	13783277		M	1.50 - 2.50	TXL	2.10 - 3.00
13783266	13783280		M	1.50 - 2.50	G/SXL	2.60 - 3.70
13783267	13783282		M	2.00 - 3.00	TXL	2.40 - 3.35
13783268	13783283		M	2.00 - 3.00	G/SXL	2.89 - 4.21
13783269	13783284		M	4.00 - 6.00	TXL	3.40 - 4.80

Other plating options are available upon request.

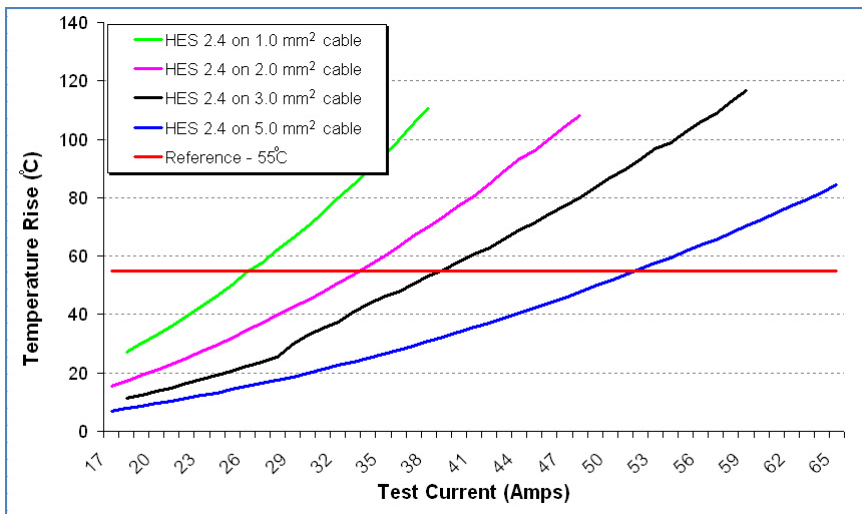▶ ## Temperature Rise Curve for Delphi HES 1.0 mm Terminal

▶ ## Temperature Rise Curve for Delphi HES 1.6 mm Terminal
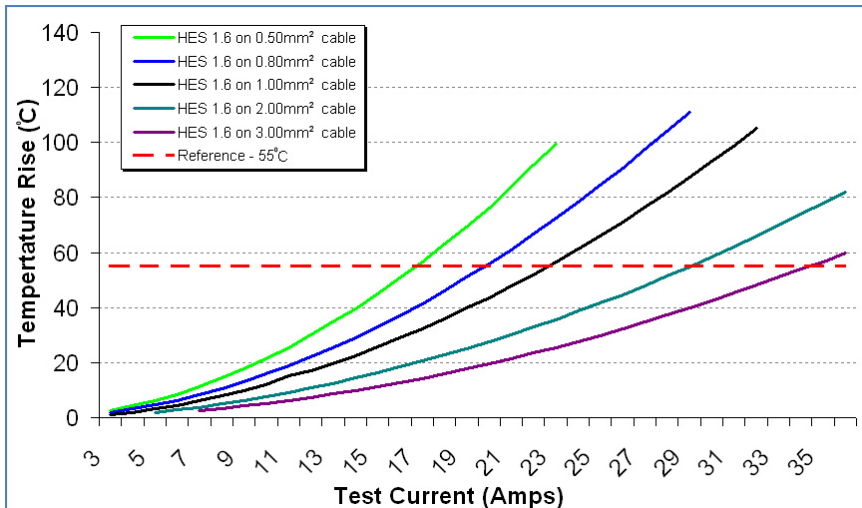
▶ ## Temperature Rise Curve for Delphi HES 2.4 mm Terminal

These general application guidelines are for reference only and may not account for all the variables that would be present in an actual application. For additional detailed product performance information, contact Delphi.

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▶ The Delphi Advantage

Delphi is one of the world's leading automotive suppliers of advanced terminals, connectors, sealing, wiring and cable products. Delphi's deep understanding of various connection system technologies and the company's vast research and development capabilities have enabled continuing innovation.

Delphi is a source for high value solutions and our expertise is built into every product. Delphi has a thorough understanding of markets around the world and a global network of resources. Delphi relies on its global capabilities, consistent processes, and extensive testing to develop and manufacture a comprehensive offering of terminals, connectors, sealing, wiring and cable products. The result is that Delphi provides customers with robust, reliable products and world-class quality.
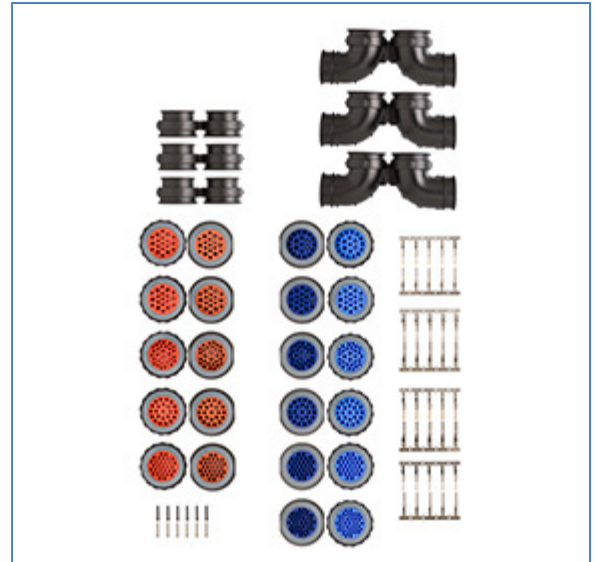
The Delphi Harsh Environment Series (HES) Connection Systems not only includes terminals, but also includes many other components.