



NICOMATIC

Z-FFC

IMPEDANCE CONTROLLED
*FLAT FLEXIBLE
CABLE*



- Flexible, Lightweight, High-Density, Foldable
- 0.50mm Pitch Standard
- White InkJet Marking Available on Z-FFC
- AS9100 Traceability Manufacturing
- Complaint with RoHS, REACH, and TSCA
- UL Style 22502 (Single-Sided)
- UL Style 22503 (Double-Sided)
- Horizontal Flame Rating, for Both Single- and Double-sided Z-film Applications

ADVANTAGES FUNCTIONALITIES

- $100 \pm 10\% \Omega$ differential impedance control
- Provides clean and consistent output signals in *Alternating Current Applications*
- Available in Single- or Double-Sided Z-Film Application
- Compatible with all ZIF/LIF Style Connectors, including Locking Tab Systems and ground plates



050 | Z3 | NN | X | LLLL - 406406 - YYY | A

1

2

3

4

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8

Example PN: 050 Z3 20 RG 0152 - SHD41 - 100S

1. Pitch

- **050:** 0.50mm Qualified

2. Style

- **Z3:** Blue Stiffeners on Matching Sides of FFC
- **Z5:** Blue Stiffeners on Alternating Sides of FFC

3. Number of Conductors (NN)

- **10-60** Conductors (Different # conductors available; contact for details. Custom upon request)

4. Conductor Size and Plating (X)

- **RG:** 0.035mm x 0.28mm (Copper Conductors with Gold Plating)

5. Cable Length (LLLL)

- Measured from Cable End to Cable End
- Available from **0051 - 1000mm**
- Other lengths possible; contact for details

6. Cable Termination

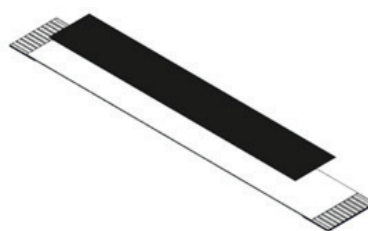
- **406406** (4mm Stiffener Length & 6mm Exposed Length) ZIF/LIF Style
- **SHD28:** Mates with Hirose™ FH28
- **SHD40:** Mates with Hirose™ FH40
- **SHD41:** Mates with Hirose™ FH41 (Ground Plate Applied)
- **SHD48:** Mates with Hirose™ FH48 (Ground Plate Applied)
- **SHD52:** Mates with Hirose™ FH52
- **SHD63:** Mates with Hirose™ FH63
- Other Locking Tab Styles available upon request

7. Impedance Control Value (YYY)

- **100:** 100 ± 10% Ω

8. Z-Film Application Style (A)

- **S:** Single-Side Z-Film Application
- **D:** Double-Side Z-Film Application



S Style Z-Film Application

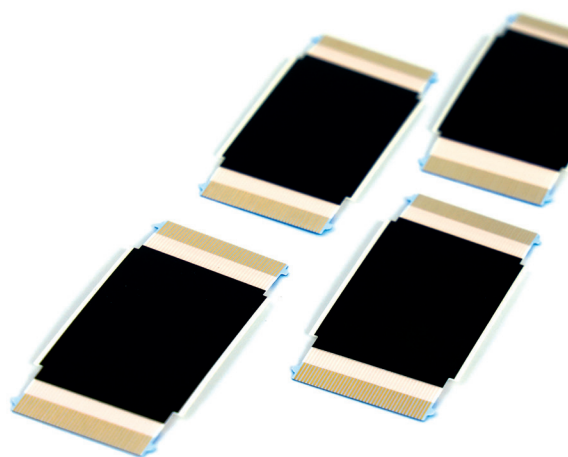
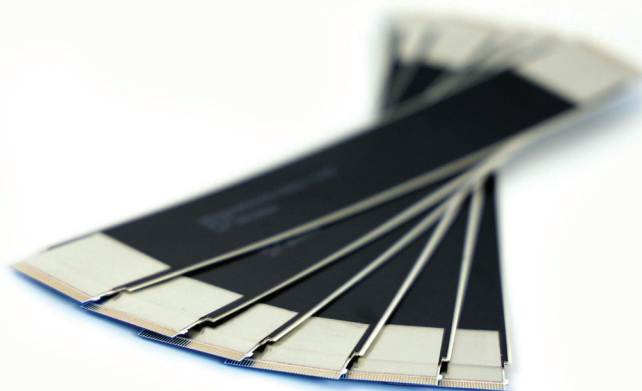


D Style Z-Film Application

Z-FILM TECHNOLOGY

Nicomatic's lightweight and highly customizable Impedance Controlled Flat Flexible Cable (**Z-FFC**) is the perfect solution for keeping clean and consistent signal transmission at high frequency applications in an Alternating Current (AC) circuit through minimizing Insertion Loss, Return Loss, and negating Crosstalk. By applying Impedance Control Film during our in-house manufacturing, Z-FFC can be created to fit your high-speed application needs.

By electing the double-sided application option, even greater shielding effectiveness in addition to impedance control properties is available without compromise to cable performance.



PART NUMBER	050Z3NNXLLLL-406406-YYA
	050Z5NNXLLLL-406406-YYA
Pitch	0.50 mm
Cable Width	(NN+1) * 0.50
Cable Thickness	0.34 (Single), 0.52 (Double)
Conductor Thickness	0.035 mm
Conductor Width	0.28 mm
Exposed Length	Varies
Stiffener Length	6.00 mm
Mating Thickness	0.30 mm
Margin	0.36 mm
Z-Film Length	Cable Length - 16 mm
Temperature	105°C
UL Flame Rating	Horizontal
YYY (Impedance Value)	100
A (Z-Film Application Style)	S, D
Current Rating	0.5 A

Nicomatic's Flat Flexible Cables are constructed with gold-plated copper conductors.

Gold plated Copper conductors are an excellent choice for projects that value greater physical durability and higher cycle counts. Furthermore, selecting the gold plated options provide maximum performance and signal transmission properties. This is Nicomatic's recommended plating option.



CARD CABLE

Nicomatic's manufactured card cable is available in 0.50 mm pitch for Impedance Control Flat Flexible Cables as a standard. Z-FFC is available in lengths from 51 to 1000 mm, but other lengths may be possible upon special request.

OTHER INFORMATION

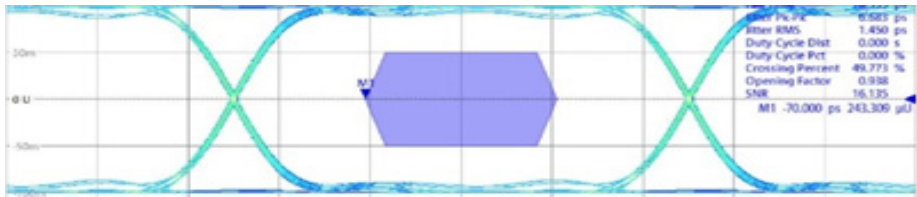
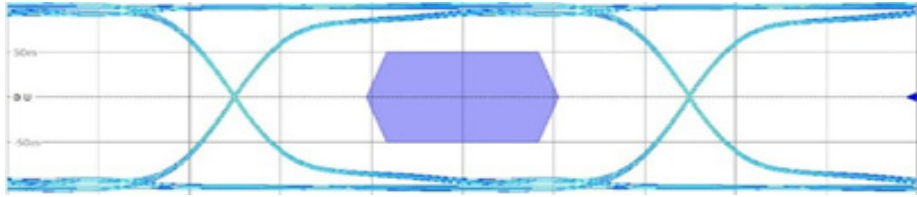
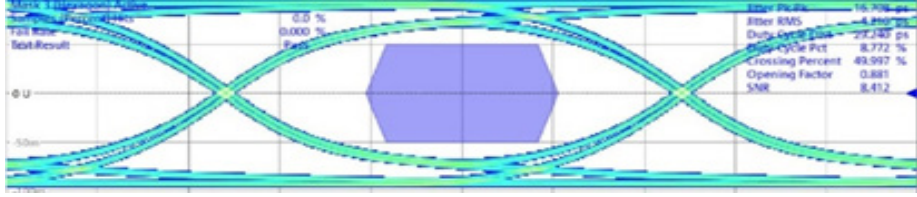
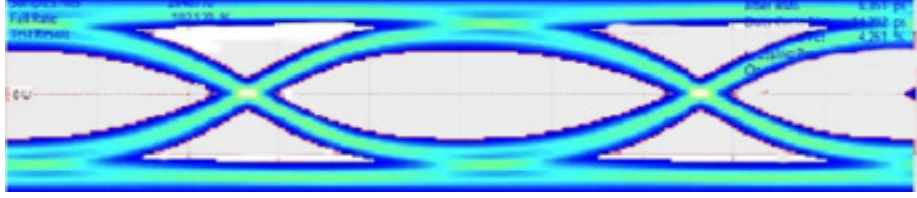
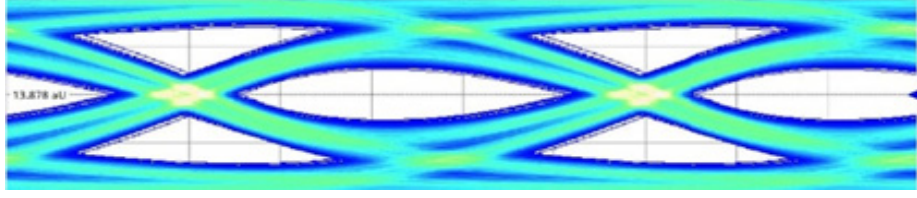
Z-FFC is intended for immobile, in-unit style applications with Alternating Current (AC) Circuits. Z-FFC were tested and qualified in a static and controlled environment. Intended results cannot be guaranteed in applications that require constant movement/flexing of the Z-FFC.

Z-FFC with lengths greater than to 1000 mm may not perform as intended.

DATA TRANSMISSION SUMMARY

Below is a summary of the data transmission through our Flexible Cables and different mediums.

LVDS Impedance Film Configuration Performance of Single-Sided Z-FFC

<p>@ 51 mm</p>	
<p>@ 152 mm</p>	
<p>@ 500 mm</p>	
<p>@ 750 mm</p>	
<p>@ 1000 mm</p>	

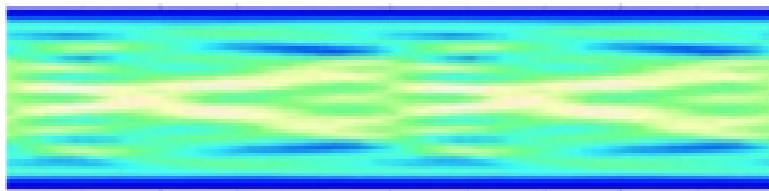
EYE DIAGRAMS

Eye Diagrams are useful graphs to evaluate and illustrate high-speed data quality. They are created by collecting variations in the transmitted signals across the time domain.

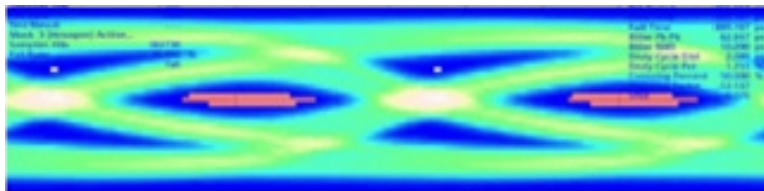
Eye Diagrams are constructed by the Eye Amplitude, Eye Height, Eye Level, and Eye Crossing Amplitude. These components combine to create the overall eye shape, which is displayed on these diagrams.

HDMI 2.0 at 6 GBPS

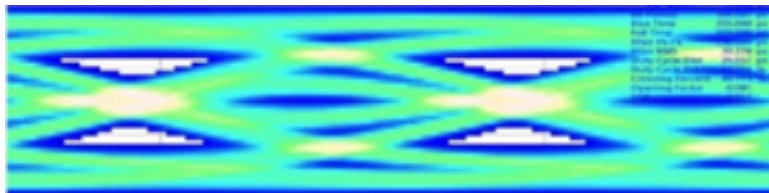
*Unshielded Standard FFC
(@ 1000 mm Length)*



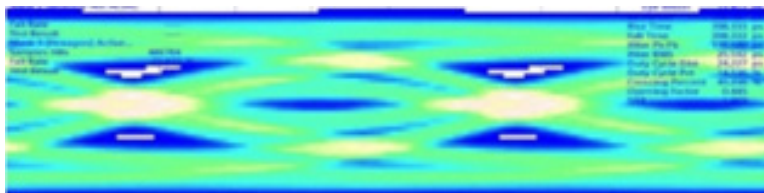
*Standard Shielded FFC
(@ 1000 mm Length)*



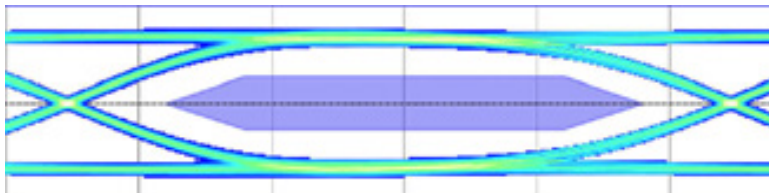
*Single-Sided Impedance Controlled FFC
(@ 1000 mm Length)*



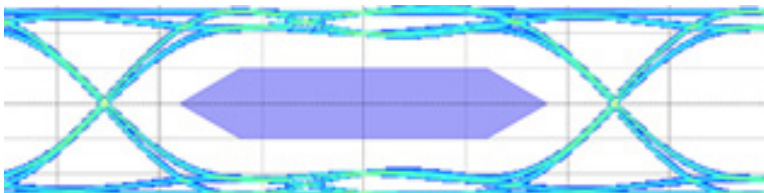
*Double-Sided Impedance Controlled FFC
(@ 1000 mm Length)*



*Single-Sided Impedance Controlled FFC
(@ 51 mm Length)*



*Double-Sided Impedance Controlled FFC
(@ 51 mm Length)*

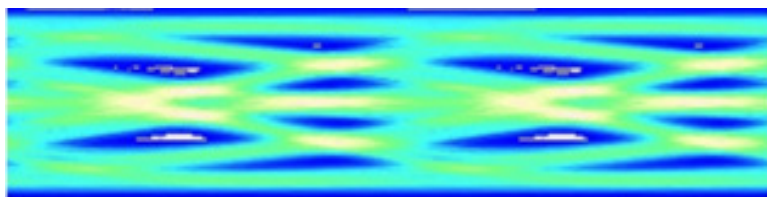


EYE DIAGRAMS

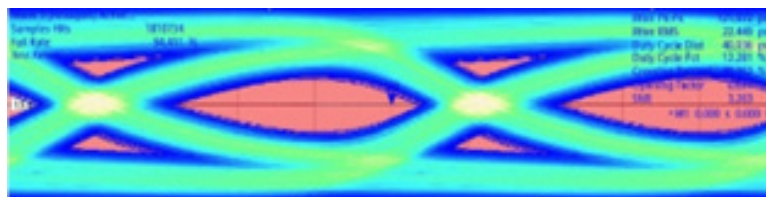
Typically, thinner bands and large “eye” shapes are indicators of high-quality data transmission and performance, with minimized loss. Examples of this are the Impedance Control FFC samples at 51mm length across all four tested protocols.

LVDS at 3 GBPS

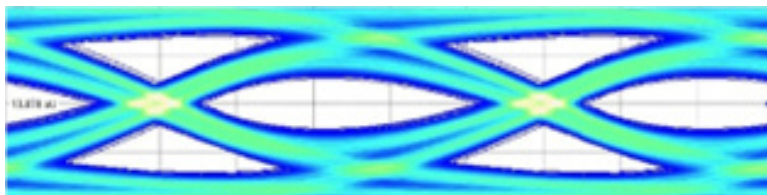
*Unshielded Standard FFC
(@ 1000 mm Length)*



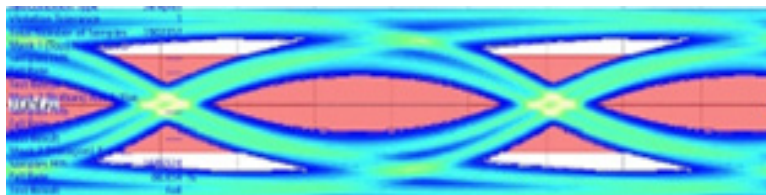
*Standard Shielded FFC
(@ 1000 mm Length)*



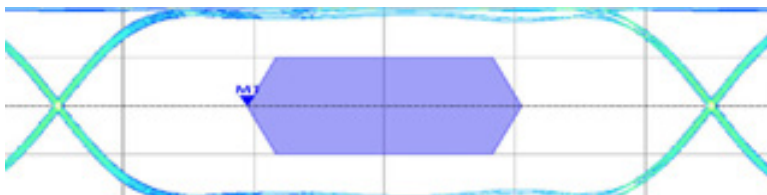
*Single-Sided Impedance Controlled FFC
(@ 1000 mm Length)*



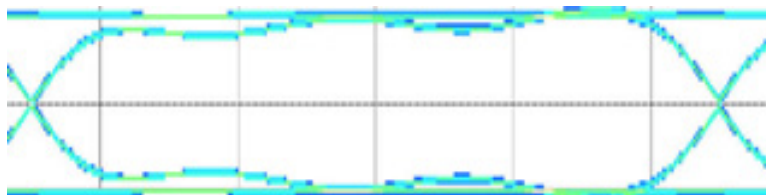
*Double-Sided Impedance Controlled FFC
(@ 1000 mm Length)*



*Single-Sided Impedance Controlled FFC
(@ 51 mm Length)*



*Double-Sided Impedance Controlled FFC
(@ 51 mm Length)*



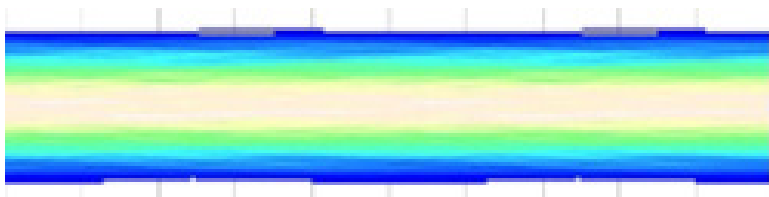
EYE DIAGRAMS

Impedance control and signal quality are directly related to FFC length. Longer lengths typically have poorer performance results, while shorter cable lengths yield the best and highest quality. This relationship is seen across all the illustrated protocols.

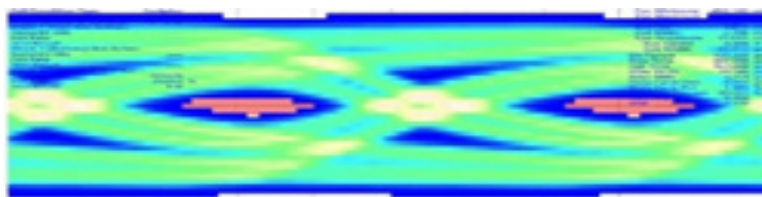
10 GBPS is the highest tested data rate. The displayed diagrams for USB 3.1 illustrate the difficulty in transmitted data across greater cable lengths. However, shorter cables still yield passing results.

USB 3.1 at 10 GBPS

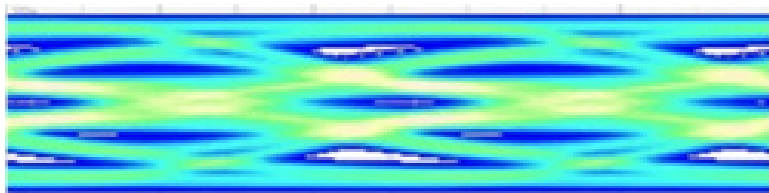
*Unshielded Standard FFC
(@ 1000 mm Length)*



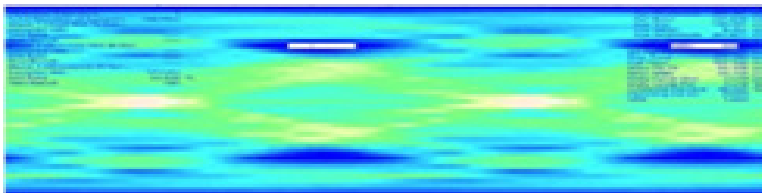
*Standard Shielded FFC
(@ 1000 mm Length)*



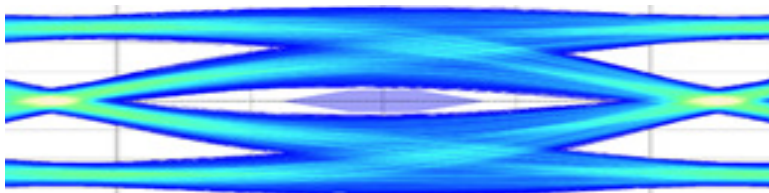
*Single-Sided Impedance Controlled FFC
(@ 1000 mm Length)*



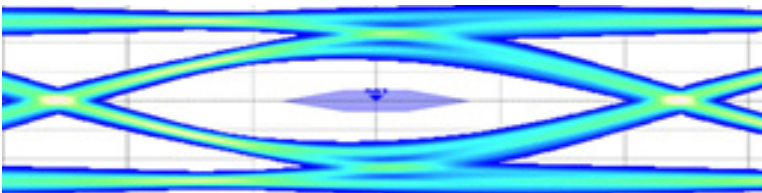
*Double-Sided Impedance Controlled FFC
(@ 1000 mm Length)*



*Single-Sided Impedance Controlled FFC
(@ 51 mm Length)*



*Double-Sided Impedance Controlled FFC
(@ 51 mm Length)*



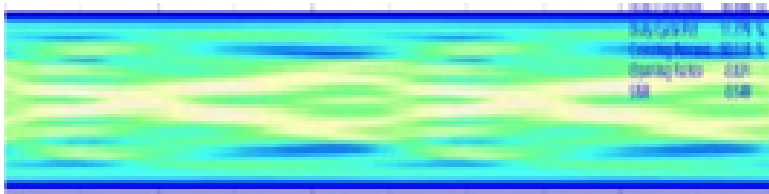
EYE DIAGRAMS

V-By-One is the final tested protocol. In summary, it illustrates a consistently higher quality performance with the Single-Sided configuration of the Impedance Control FFC.

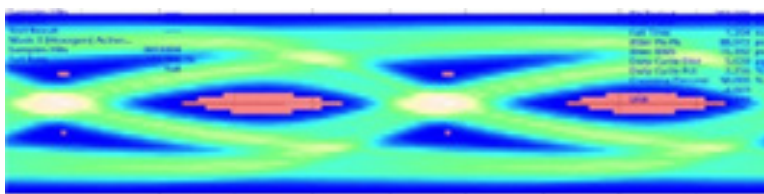
Typically, minimizing the distance between signals (length of FFC) will maximize the data rate and quality.

V-By-One at 4 GBPS

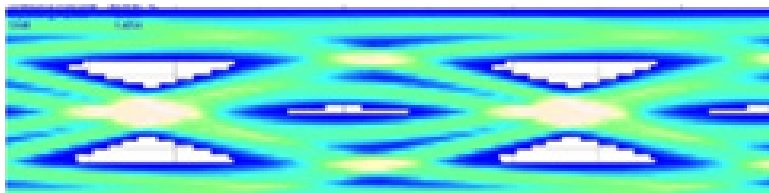
*Unshielded Standard FFC
(@ 1000 mm Length)*



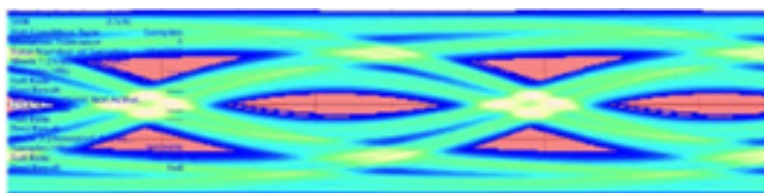
*Standard Shielded FFC
(@ 1000 mm Length)*



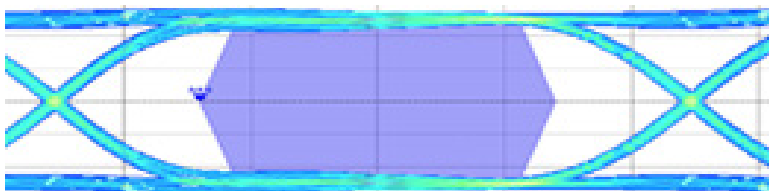
*Single-Sided Impedance Controlled FFC
(@ 1000 mm Length)*



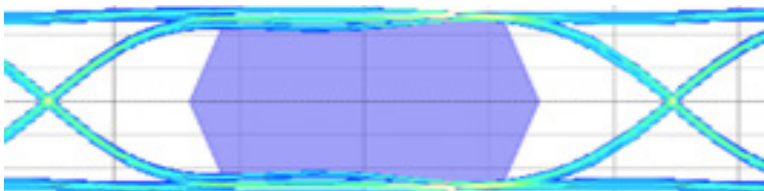
*Double-Sided Impedance Controlled FFC
(@ 1000 mm Length)*



*Single-Sided Impedance Controlled FFC
(@ 51 mm Length)*

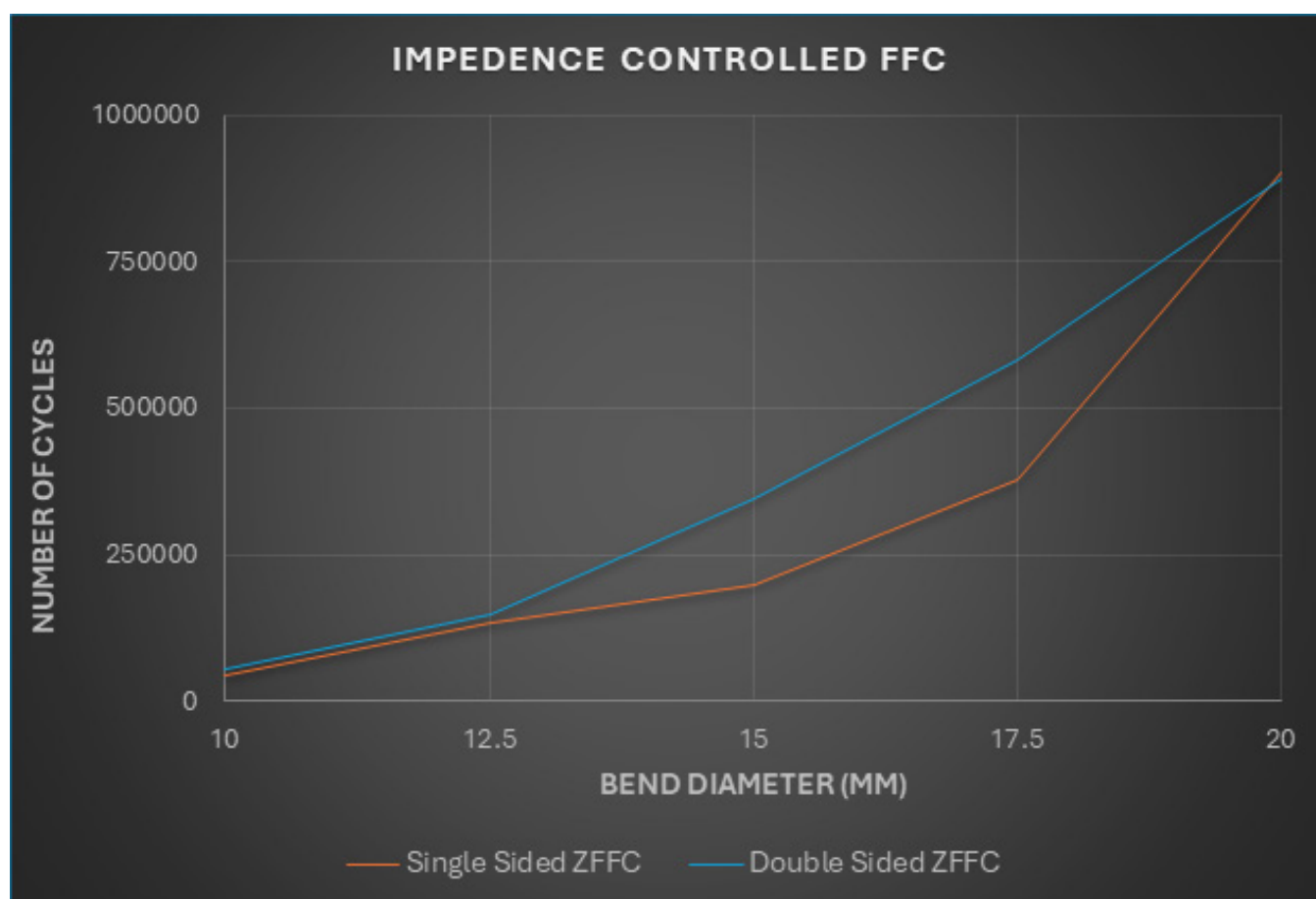


*Double-Sided Impedance Controlled FFC
(@ 51 mm Length)*



FLEXIBILITY TEST DATA

Below is a graphical illustration of Impedance Control FFCs flexibility performance in both Single- and Double-Sided impedance film applications. Data was collected through flexing the FFCs across different bend diameters through thousands of cycles, until electrical continuity of the traces was no longer maintained within the FFC. Although not originally intended for dynamic applications, if designed with proper strain reliefs, Z-FFCs can be utilized in cyclical motion applications.



NOTE: Double-Sided Z-FFC that is cyclically flexed at very high cycle counts tend to experience Z-Film delamination from the FFC surface. Please contact sales@nicomatic.com today in regard to design inquiries.

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