StabilityFlex™ Microwave/RF Cable Assemblies

DATA SHEET / 2Z-014

MODELS:

SF-24 // 2.4mm color-coded StabilityFlex™ cables
SF-24-LP // 2.4mm color-coded StabilityFlex™ cables Low Profile
SF-292 // 2.92mm color-coded StabilityFlex™ cables
SF-292-LP // 2.92mm color-coded StabilityFlex™ cables Low Profile
SF-SMA // SMA color-coded StabilityFlex™ cables
SF-SMA-LP // SMA color-coded StabilityFlex™ cables Low-Profile
SF-N // Type N color-coded StabilityFlex™ cables
SF-N-LP // Type N color-coded StabilityFlex™ cables Low-Profile

Maury Microwave

// MARCH 2025

StabilityFlex™ Microwave/RF Cable Assemblies

SERIES SF-24, SF-24-LP, SF-292, SF-292-LP, SF-SMA, SF-SMA-LP, SF-N, SF-N-LP

Features and Benefits

- Excellent value
- Low insertion loss
- Reliable and repeatable measurements
- Amplitude and phase stable with flexure
- High mating-cycle durability

Typical Applications

- RF and microwave instruments
- Bench-top testing
- Probe station integrations
- RF production testing
- Component/module testing
- ATE systems

Description

Maury Microwave's StabilityFlex™ series sets the standard for high-end all-purpose test and measurement cable assemblies. Designed for general testing applications, StabilityFlex™ offers excellent value with its low cost, low insertion loss, excellent return loss, flexibility, and amplitude and phase stability. StabilityFlex™ is the ideal interconnection for reliable and repeatable measurements when mated with test instruments including bench-top testing, on-wafer characterization and ATE systems.

StabilityFlex™ cable assemblies are now part of the ColorConnect™ family! Following the proposed IEEE high-frequency connector/adapter color convention, StabilityFlex™ cable assemblies are the first commercially available assemblies to offer clear indications of compatibility and intermatability. ColorConnect™ makes it a simple matter to avoid and eliminate damaged equipment, degraded equipment reliability, degraded performance and lengthy maintenance times due to improper mating (and attempted mating) of incompatible interconnects.

Electrical Specifications

StabilityFlex™ Cable Type	SF-24	SF-24-LP	SF-292	SF-292-LP	SF-SMA	SF-SMA-LP	SF-N	SF-N-LP
Maximum Frequency GHz	50		40		26.5		18	
VSWR (typical)	1.30:1		1.25:1					
Typical Insertion Loss (cable only)"	1.49 dB/ft		1.31 dB/ft		0.77 dB/ft		0.60 dB/ft	
Impedance (nominal)	50 ohm							
Phase Stability vs Flexure (typical)	±8°		±6°		±4°		±3°	
Amplitude Stability vs Flexure (typical)	±0.08°		±0.05 dB					
Velocity of Propagation	74% (nominal)							
Shielding Effectiveness	> 90 dB (DC-18 GHz)							
Time Delay (nominal)	1.37 ns/ft (4.5 ns/m)							

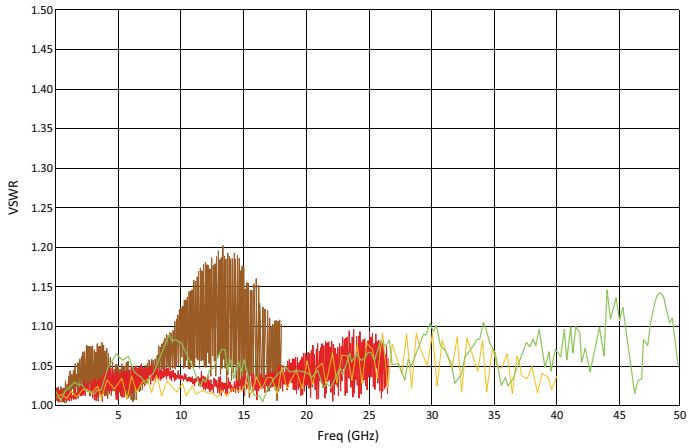
Mechanical Specifications

StabilityFlex™ Cable Type	SF-24	SF-24-LP	SF-292	SF-292-LP	SF-SMA	SF-SMA-LP	SF-N	SF-N-LP
Center Conductor Material	Stranded Silver Plated Copper							
"Maximum Outer Diameter (Connector)"	0.38 in (9.8 mm)						0.86 in (21.9 mm)	
"Maximum Outer Diameter (Cable)"	0.4 in (10.2 mm)	0.16 in (4.06 mm)	0.4 in (10.2 mm)	0.16 in (4.06 mm)	0.4 in (10.2 mm)	0.21 in (5.35 mm)	0.4 in (10.2 mm)	0.21 in (5.35 mm)
Nominal Weight	170 g/m (1.83 Oz/ft)	30 g/m (0.32 Oz/ft)	170 g/m (1.83 Oz/ft)	30 g/m (0.32 Oz/ft)	190 g/m (2.04 Oz/ft)	50 g/m (0.54 Oz/ft)	190 g/m (2.04 Oz/ft)	50 g/m (0.54 Oz/ft)
Min. Static Bend Radius	1.97 in (50.0 mm)	0.63 in (16.0 mm)	1.97 in (50.0 mm)	0.63 in (16.0 mm)	1.97 in (50.0 mm)	0.63 in (16.0 mm)	1.97 in (50.0 mm)	0.63 in (16.0 mm)
Min. Dynamic Bend Radius	3.94 in (100.0 mm)	1.97 in (50.0 mm)	3.94 in (100.0 mm)	1.97 in (50.0 mm)	3.94 in (100.0 mm)	1.97 in (50.0 mm)	3.94 in (100.0 mm)	1.97 in (50.0 mm)
Flex Life Cycles	>10,000							
Crush Resistance	440 lbf/in (78 Kgf/cm)	80 lbf/in (14 Kgf/cm)	440 lbf/in (78 Kgf/cm)	80 lbf/in (14 Kgf/cm)	440 lbf/in (78 Kgf/cm)	80 lbf/in (14 Kgf/cm)	440 lbf/in (78 Kgf/cm)	80 lbf/in (14 Kgf/cm)
Operating Temperature Range	-67° to +185 °F (-55°+85°C)							
RoHS/REACH	Yes							

Maury StabilityFlex™ Cable Assembly Typical Performance

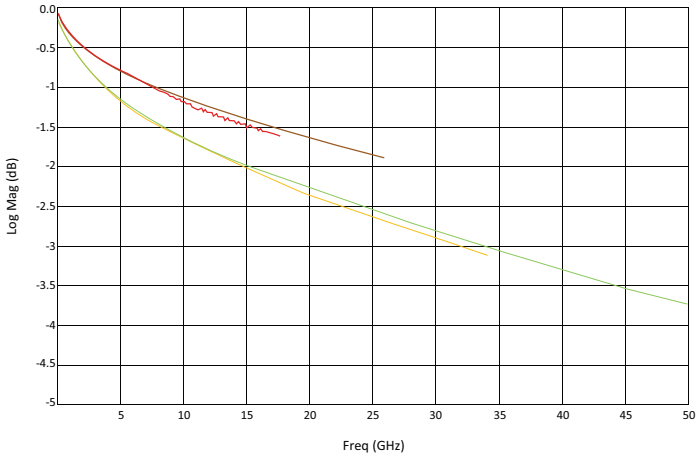
Maury StabilityFlex™ 36" Cable Assembly Typical VSWR

SF-24 SF-292 SF-SMA SF-N



Maury StabilityFlex™ 36" Cable Assembly Typical Insertion Loss

SF-24 SF-292 SF-SMA SF-N



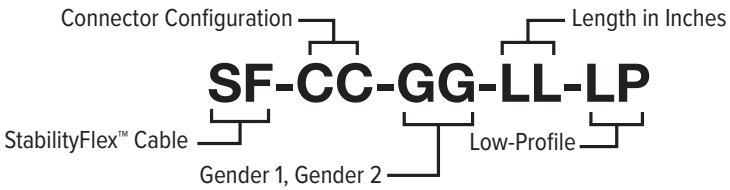
CC	GG	LL (Standard Lengths)**	Options
N (Type N)* SMA 292 (2.92mm) 24 (2.4mm)	MM (Male To Male) MF (Male to Female) FF (Female To Female)	24 36 48 60 78	Low-Profile

** Type N available in male only.*

*** StabilityFlex™ Low-Profile cable assemblies only; standard profile by special order*

Ordering Instructions for StabilityFlex™ Cable Assemblies

Standard StabilityFlex™ Cable Assemblies

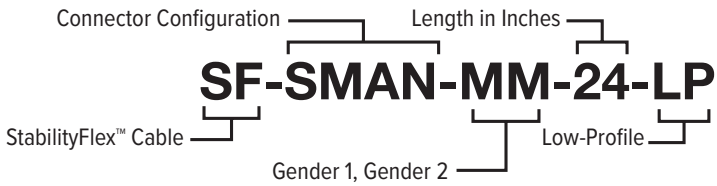


EXAMPLE:

The following is a StabilityFlex™ Low-Profile cable assembly with SMA male connectors on both ends, 24 inches in overall length, and low-profile option.

EXAMPLE:

The following is a StabilityFlex™ Low-Profile cable assembly with SMA male connecter on one end and Type N connector on the other end, 24 inches overall length, and low-profile option.

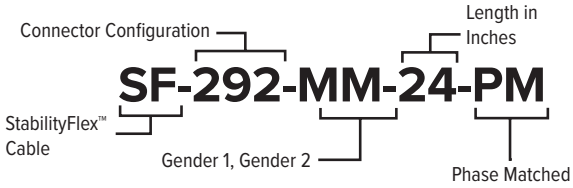


StabilityFlex™ Cable Assemblies — Phase Matched

StabilityFlex™ Phase-Matched Cable Assemblies have been designed for applications where strict phase equality between multiple paths are required. StabilityFlex™ PM Cable Assemblies are matched within ±0.5°/GHz and available as sets of two or more assemblies. StabilityFlex™ PM Cable Assemblies are offered in standard and low-profile formats and maintain the mechanical and electrical characteristics of the original assembly. Phase-matched assemblies are available with 2.4mm, 2.92mm, SMA and Type N connectors and in all lengths.

Example:

To specify a StabilityFlex™ Phase-Matched Cable Assembly set, add "PM" at the end of the SF model number, as shown in the example below. "PM" indicates standard configuration Phase-Matched sets.

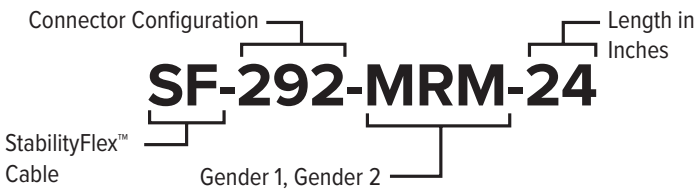


StabilityFlex™ Cable Assemblies — Swept Right-Angle

StabilityFlex™ Cable Assemblies with swept right-angle connectors are designed for applications requiring a fixed and stable bend where traditional cable assemblies may be inconvenient. With a bend radius of 0.5 inches and a cable-to-connector length of 2 inches, right-angle connectors allow StabilityFlex™ Cable Assemblies to retain the electrical and mechanical specifications of the traditional assembly while removing stresses related to hand-formed bends. StabilityFlex™ assemblies with swept right- angle connectors are built on demand and are available with 2.4mm, 2.92mm, SMA and Type N connectors and in all lengths.

Example:

The following is a StabilityFlex™ cable assembly with one 2.92mm male connector and one 2.92mm male swept right-angle connector, and 24 inches overall length.



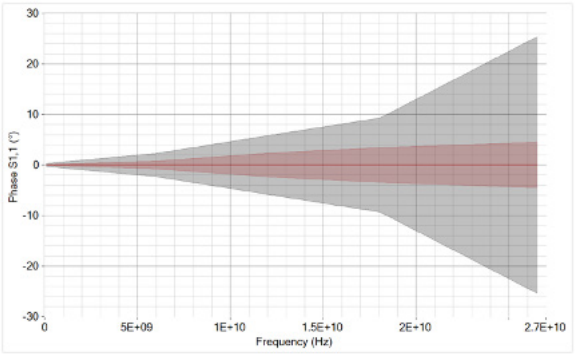
S-parameter measurements with uncertainty

A cable's *phase stability with flexure* specification is a metric used to communicate the impact of cable movement on a DUT measurement. It implies that lower specifications lessen the impact on the measurement (i.e. a cable with a 2° phase stability with flexure specification will have a lesser impact on a measurement than a cable with a 5° phase stability). However, the methods used to determine this specification may not be consistent across manufacturers, and likely do not represent the actual cable movement range of a user.

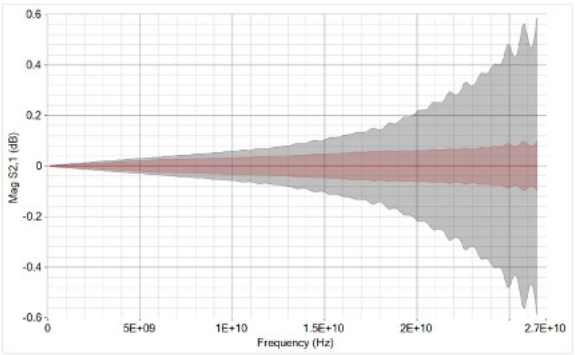
A better metric to understand a cable's impact on a DUT measurement is "uncertainty contribution". The cable's impact on measurement uncertainty can be calculated by moving the cable through a user's actual range of motion and recording the S-parameters across the movement. This technique has been thoroughly documented by the European Association of National Metrology Institutes (EURAMET)* and has been made commercially available in Maury's Insight™** calibration and measurement software platform.

The plots on the right show typical S-parameter measurements with uncertainty boundaries on different types of DUTs. The boundaries shown only consider the cable's direct contribution on measurement uncertainty.

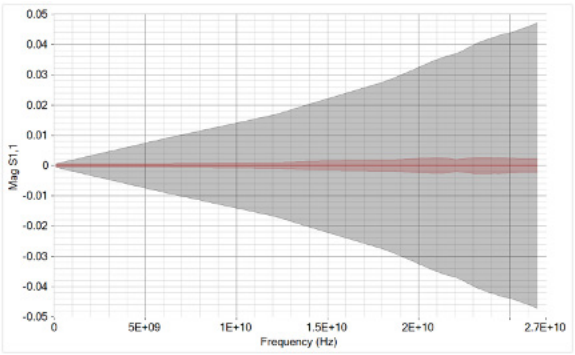
** https://www.maurymw.com/pdf/I-CAL-GUI-012.pdf*
*** https://www.maurymw.com/Precision/Insight_Software.php*



S11_phase measured on a short circuit termination SF-SMA-MM-36 shown in red; leading global competitor shown in grey



S21_mag measured on a short circuit termination SF-SMA-MM-36 shown in red; leading global competitor shown in grey



S11_mag measured on a short circuit termination SF-SMA-MM-36 shown in red; leading global competitor shown in grey

Typical Insetion Loss/Attenuation

(1:1 VSWR, 25 C, Sea Level, Cable Only)

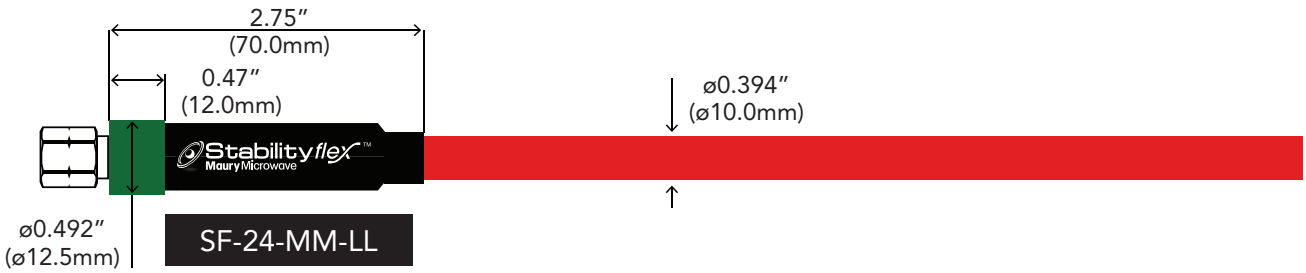
Freq (GHz)	SF-24 SF-24-LP (dB/100 ft)	SF-292 SF-292-LP (dB/100 ft)	SF-N SF-N-LP (dB/100 ft)	SF-SMA SF-SMA-LP (dB/100 ft)
1	17.72	17.72	11.73	11.73
2	25.38	25.38	17.04	17.04
4	36.55	36.55	25.00	25.00
6	45.39	45.39	31.47	31.47
8	53.01	53.01	37.16	37.16
12	66.16	66.16	47.21	47.21
18	82.88	82.88	60.37	60.37
26.5	103.18	103.18	N/A	76.85
40	130.95	130.95	N/A	N/A
50	149.36	N/A	N/A	N/A

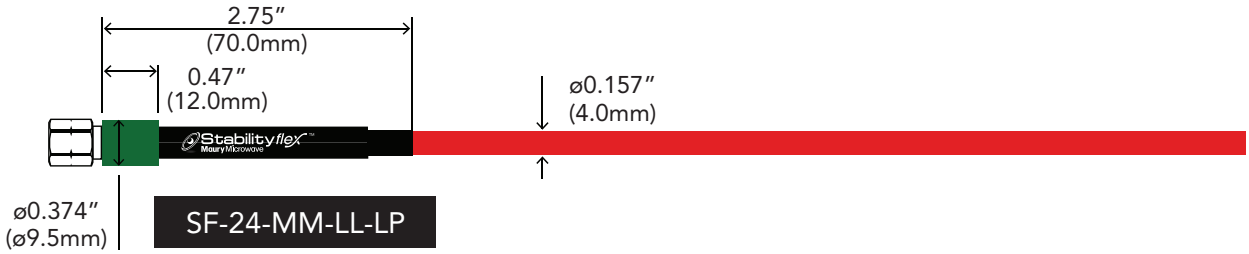
Average Power Handling

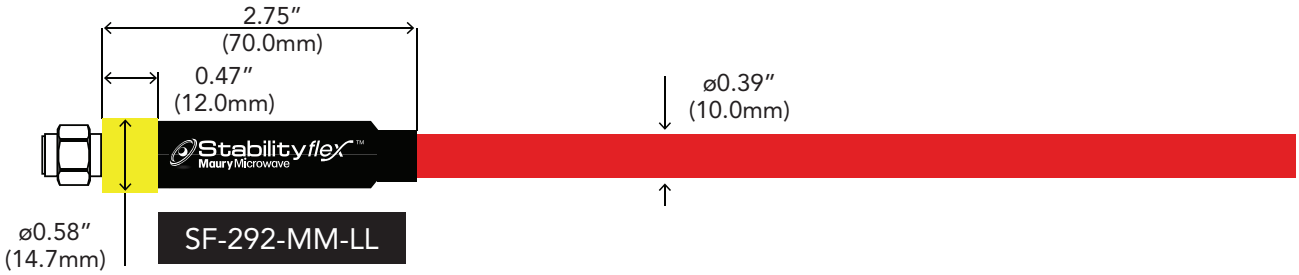
(1:1 VSWR, 25 C, Sea Level, Cable Only)

Freq (GHz)	SF-24 SF-24-LP Watts (Max)	SF-292 SF-292-LP Watts (Max)	SF-N SF-N-LP Watts (Max)	SF-SMA SF-SMA-LP Watts (Max)
1	108	108	149	149
2	75	75	102	102
4	52	52	70	70
6	42	42	55	55
8	36	36	47	47
12	29	29	37	37
18	23	23	29	29
26.5	19	19	N/A	23
40	15	15	N/A	N/A
50	13	N/A	N/A	N/A

StabilityFlex™
Dimensions







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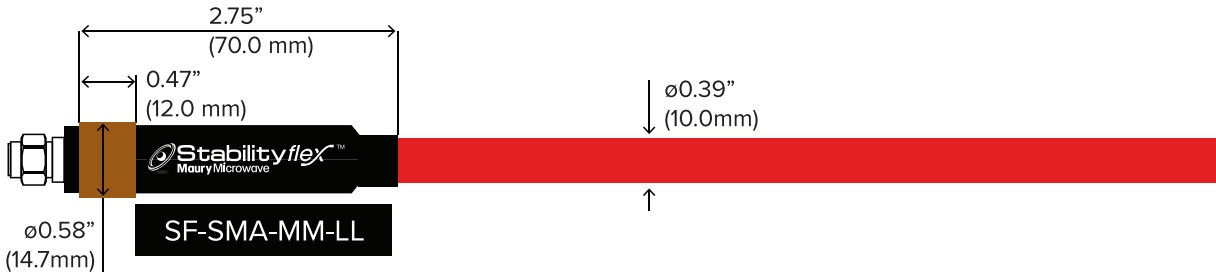

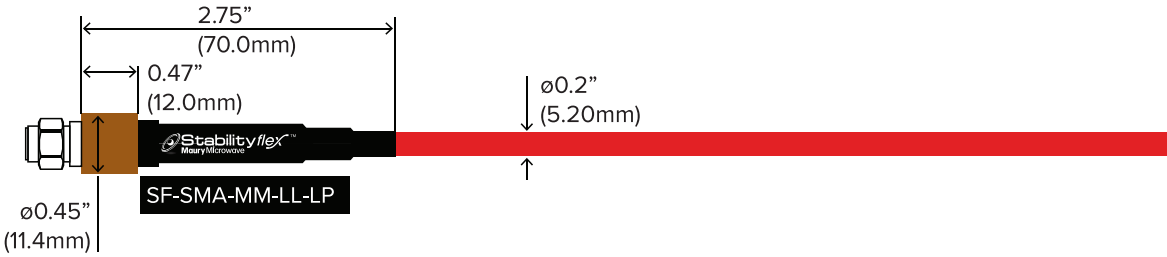

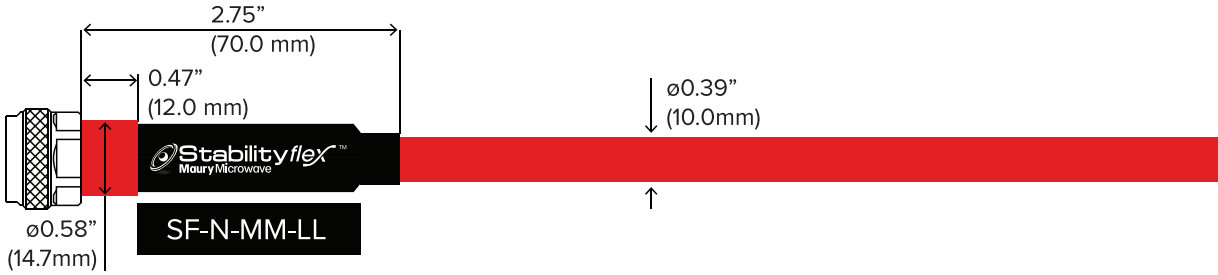

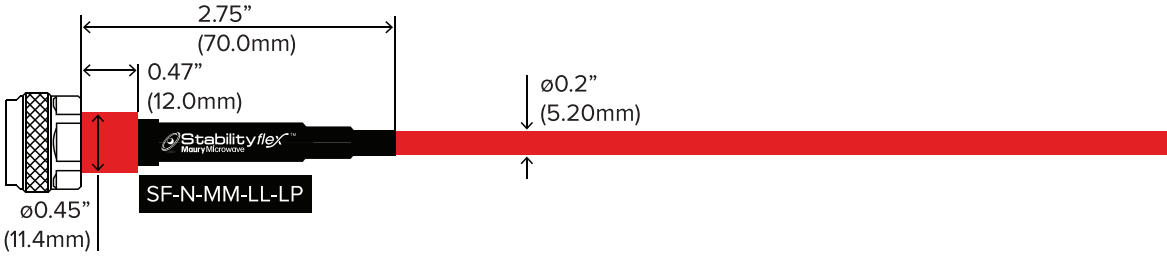

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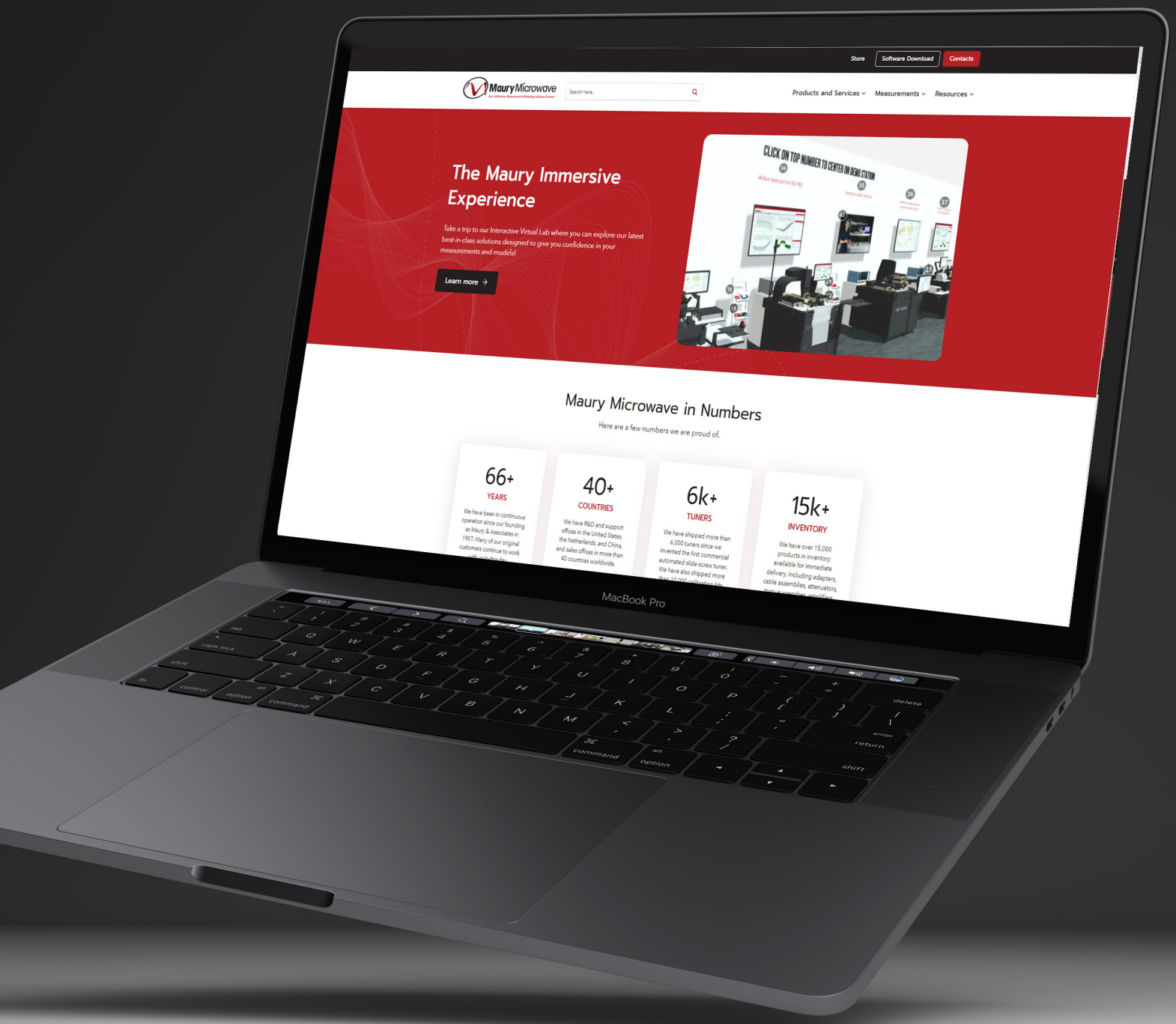

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