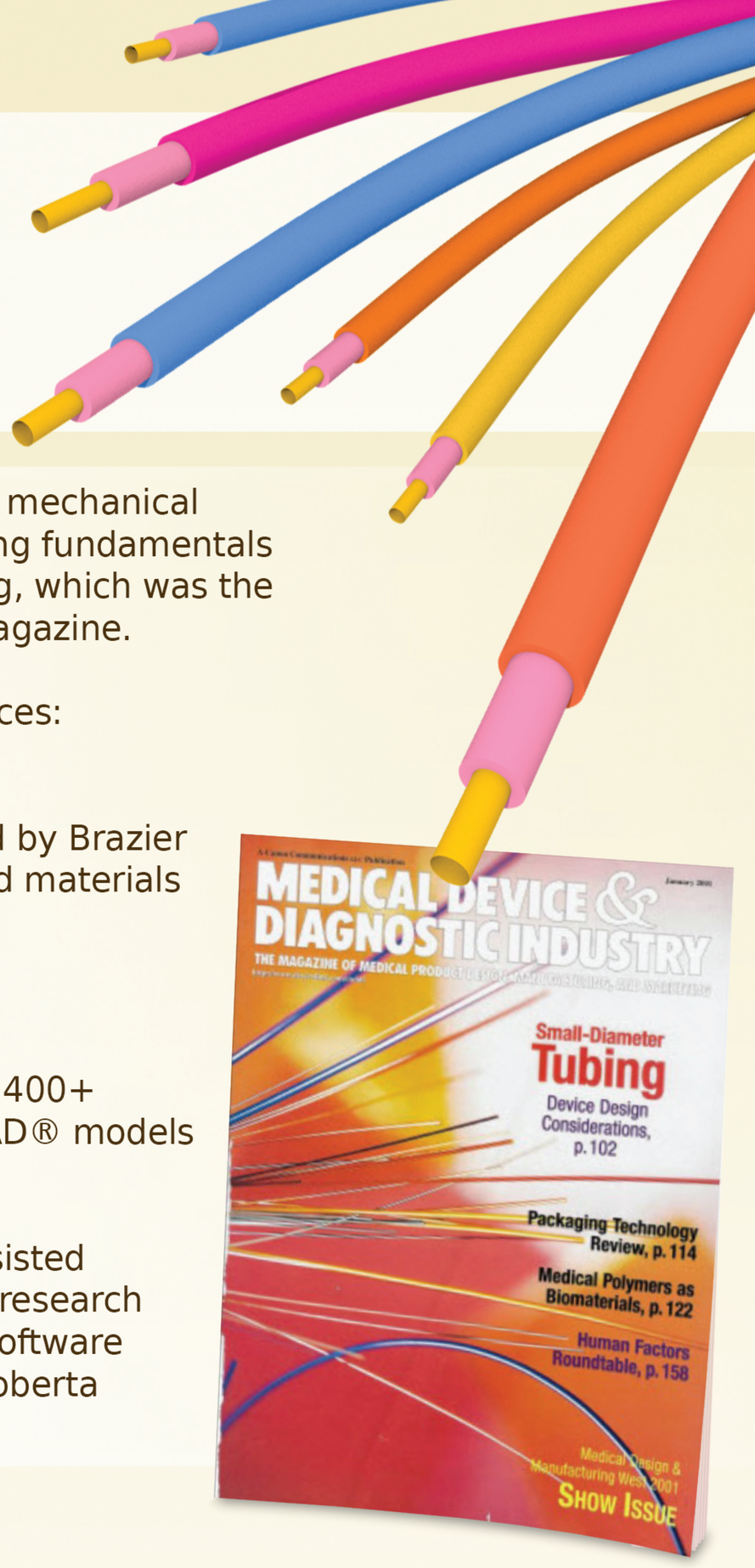
CathCAD®

THE SOFTWARE FOR DEVELOPING YOUR NEXT MICROCATHETER



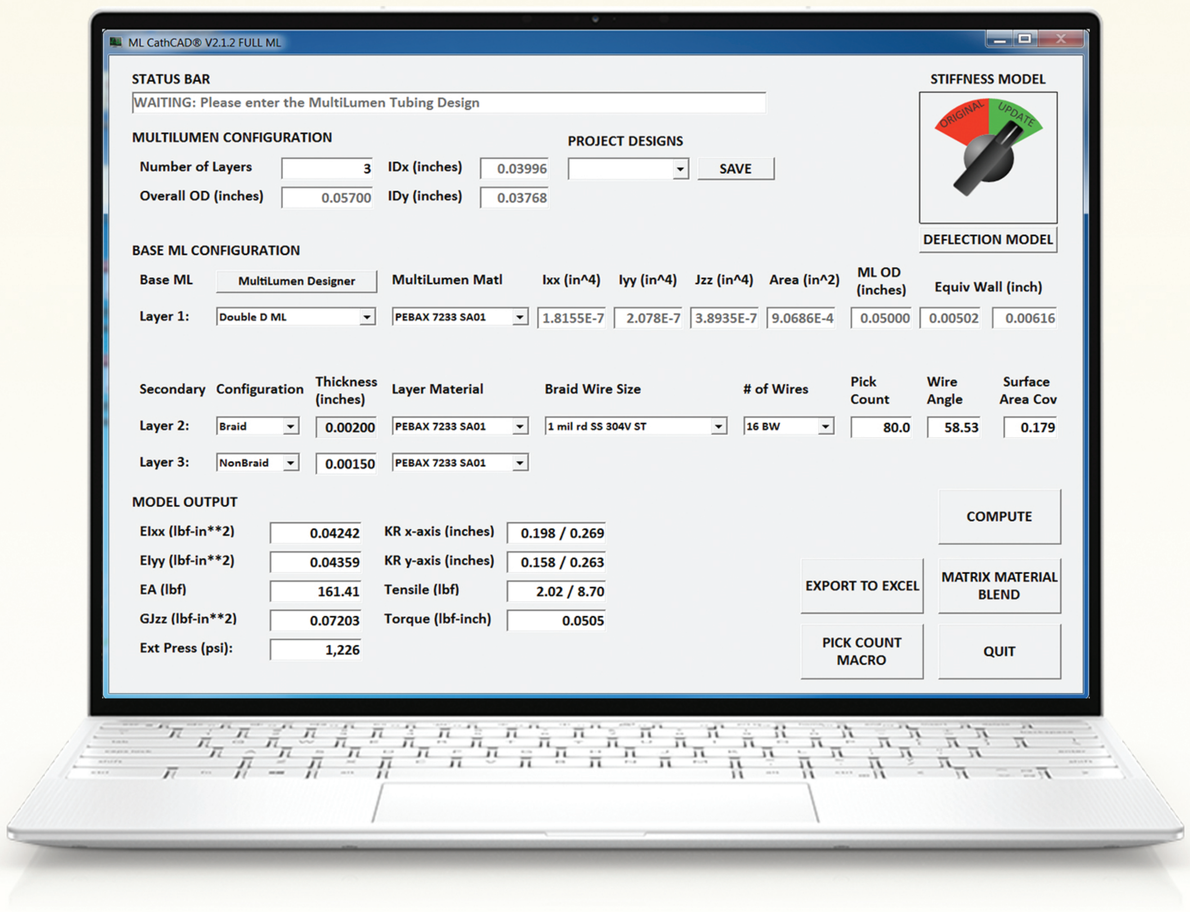
CathCAD® is the software solution that allows the User to analyze and predict the mechanical characteristics of microcatheters. The Software is based (in part) on the engineering fundamentals summarized in the article, Design Considerations in Small-Diameter Medical Tubing, which was the January, 2001 Cover Story in Medical Device & Diagnostic Industry (MDDI) magazine.

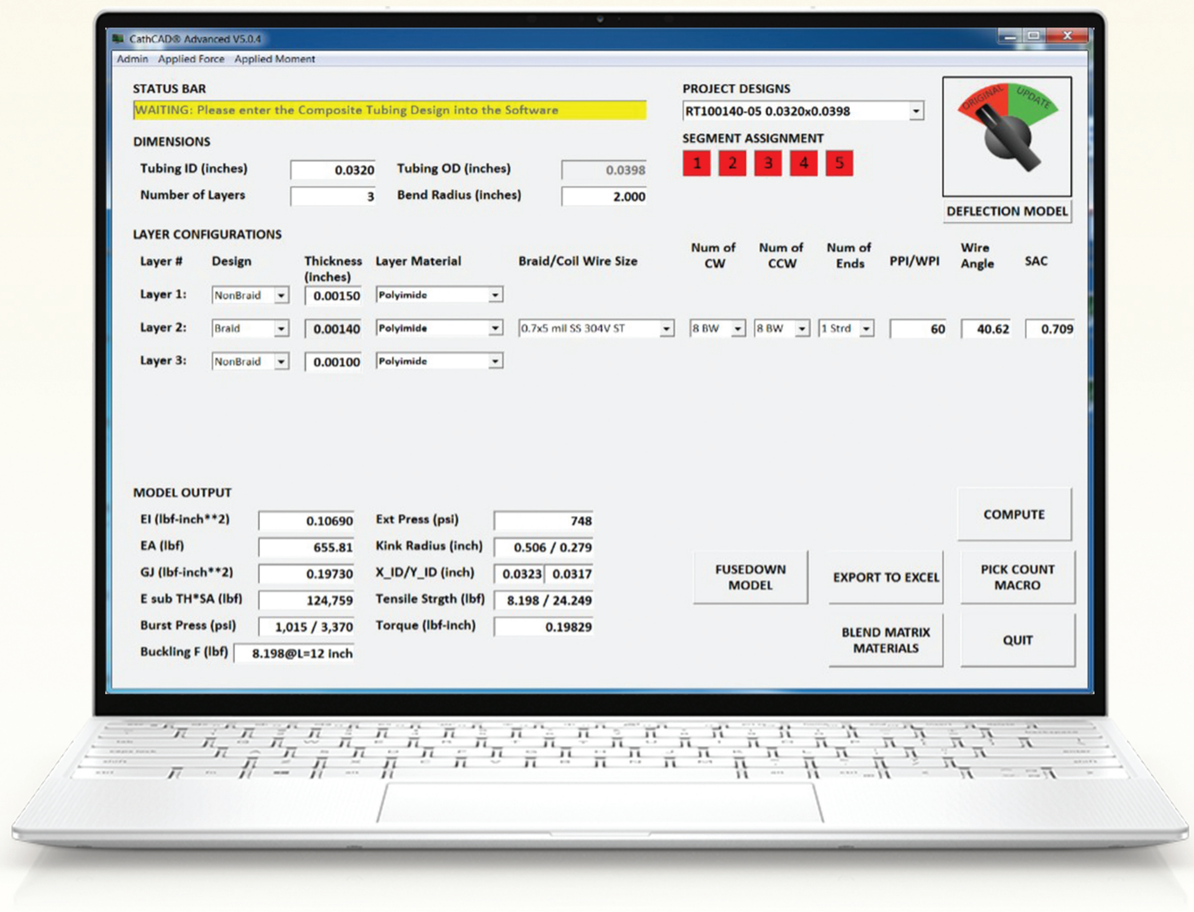
The computational algorithms are based on the following models and/or data sources:

- Mechanics of Materials
- Composite Laminate Theory
- The Tube Buckling (kink radius) computations are based on the model developed by Brazier
- Vendor material data sheets are used for loading material properties for standard materials used in medical catheter products.
- The software computational engine is NOT based on empirical or tabulated measurement data.

As of 2025 our customer base consists of over 200 medical device firms with over 400+ licensed users. Since the software inception over 300,000+ computational CathCAD® models have been completed by our licensed Users.

The Software was mentioned in a peer reviewed journal publication: Computer Assisted Surgery is an open access journal that aims to improve patient care by publishing research which advances the use of computers during surgical treatment. The CathCAD® software was utilized by researchers in designing a sensorized guiding catheter Authors: Roberta Piazza, Sara Condino, Aldo Alberti, Raffaella Nice





Software License includes three variants:

- CathCAD® Standard.
- CathCAD® Advanced, and
- MultiLumen CathCAD®

Roth Technologies

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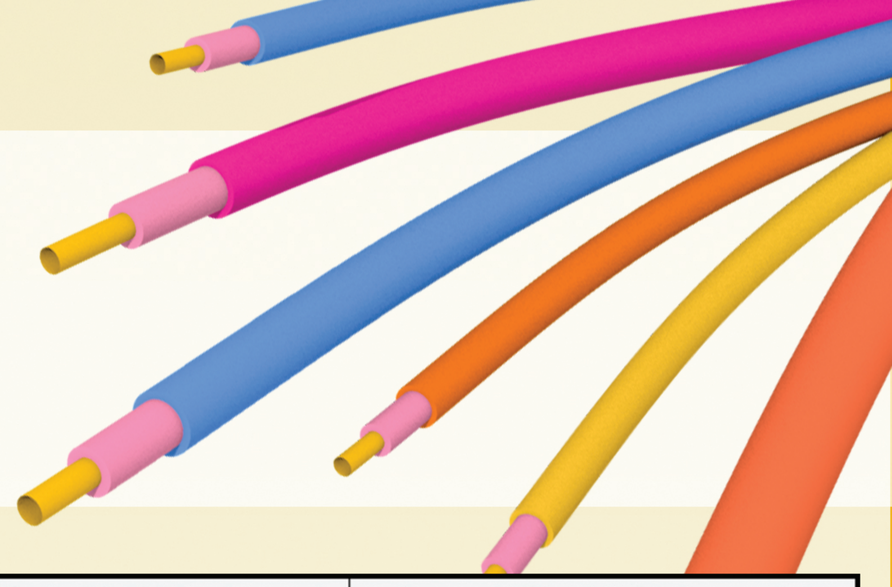
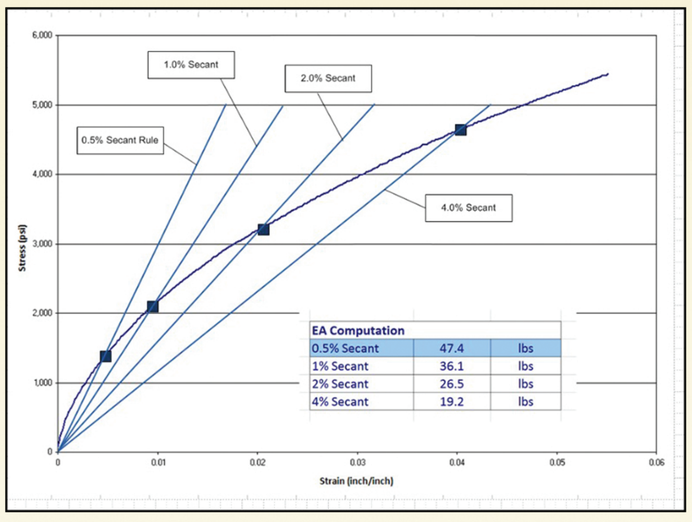
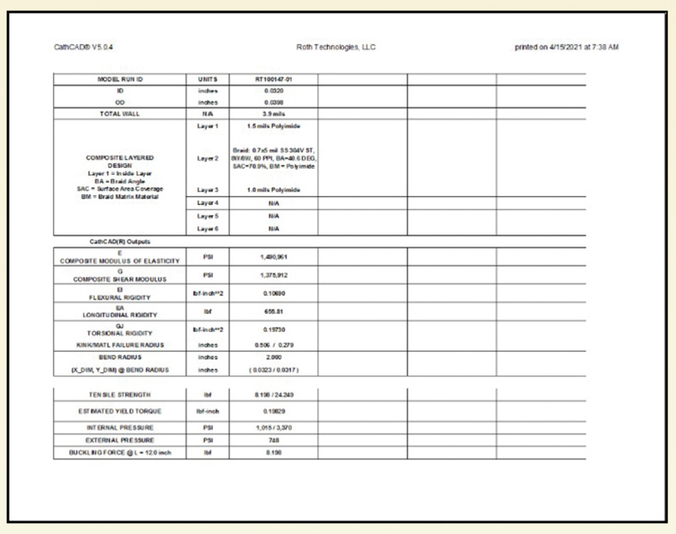


Independent comparison of the Software's outputs to actual device measured properties is typically within 25 percent for flexural, longitudinal, and torsional rigidities.This table summarizes a braiding comparison to the Software for a 7Fr guide catheter.

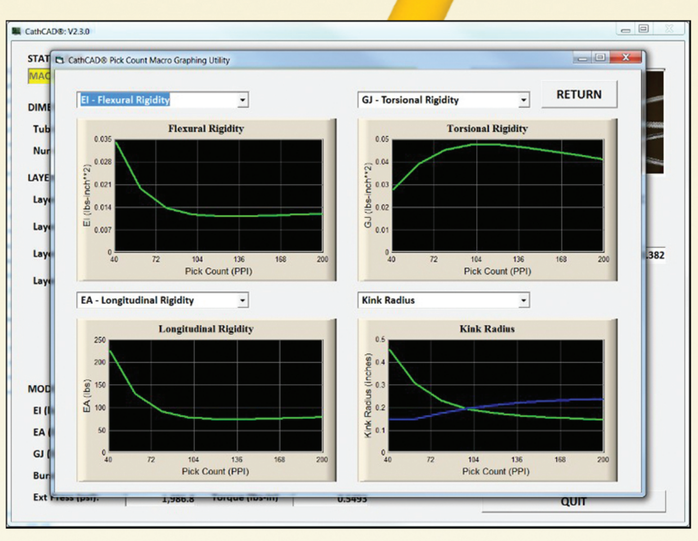
Design	Kink Radius			Flexural Modulus			Shear Modulus		
Braid Pattern	CathCAD (in)	Measured (in)	Percent Error (%)	CathCAD (ksi)	Measured (ksi)	Percent Error (%)	CathCAD (ksi)	Measured (ksi)	Percent Error (%)
1u1o1	0.451	0.460	2%	46.05	44.71	3%	160.48	157.80	2%
1u2o2		0.470	4%		46.61	1%		163.90	2%
2u2o2		0.440	2%		46.36	2%		100.30	37%



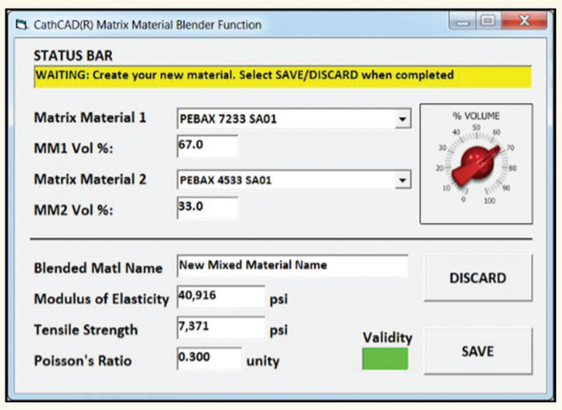
The Software assumes "small deflections" and the results from elongation testing and/or three point bending of physical samples may be directly correlated to the Software outputs.



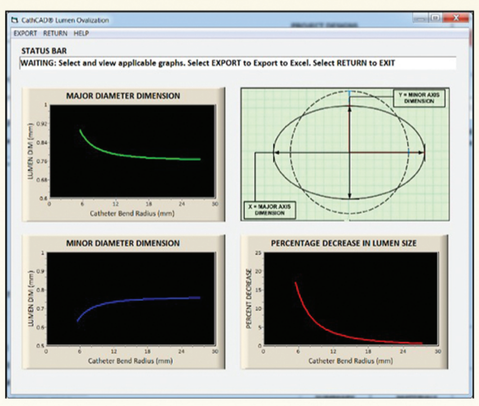
The Software outputs are seamlessly exported to Microsoft Excel in a "ready to print" format



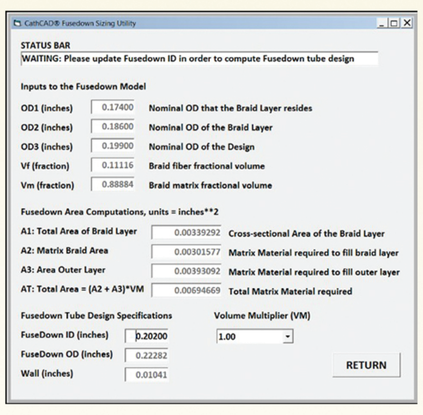
The Pick Count Maco allows the User to look at the design property outputs as a function of a range of braid angles in graphical form



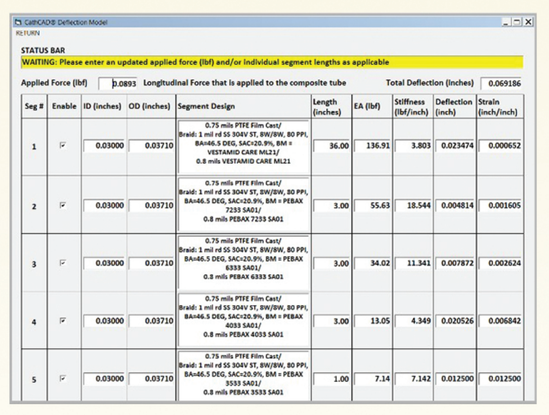
The Matrix Material Bend function allows the User to create a custom blend of two materials by volumetric percentages



The Ovalization function allows the User to review the design's ovalized dimensions as a funtion of bend radius



The Fuse-down Designer allows the User to compute the expected dimensions of the design obtained during the lamination manufacturing process.



Seg #	Enable	ID (inches)	OD (inches)	Segment Design	Length (inches)	EA (lbf)	Stiffness (lbf/inch)	Deflection (inch)	Strain (inch/inch)
1	☑	0.03000	0.03710	0.75 mils PTFE Film Cast/ Braid: 1 mil rd SS 304V ST, BW/BW, 80 PPI, BA=46.5 DEG, SAC=20.9%, BM = VESTAMID CARE ML21/ 0.8 mils VESTAMID CARE ML21	36.00	136.91	3.803	0.023474	0.000652
2	☑	0.03000	0.03710	0.75 mils PTFE Film Cast/ Braid: 1 mil rd SS 304V ST, BW/BW, 80 PPI, BA=46.5 DEG, SAC=20.9%, BM = PEBAX 7233 SA01/ 0.8 mils PEBAX 7233 SA01	3.00	55.63	18.544	0.004814	0.001605
3	☑	0.03000	0.03710	0.75 mils PTFE Film Cast/ Braid: 1 mil rd SS 304V ST, BW/BW, 80 PPI, BA=46.5 DEG, SAC=20.9%, BM = PEBAX 6333 SA01/ 0.8 mils PEBAX 6333 SA01	3.00	34.02	11.341	0.007872	0.002624
4	☑	0.03000	0.03710	0.75 mils PTFE Film Cast/ Braid: 1 mil rd SS 304V ST, BW/BW, 80 PPI, BA=46.5 DEG, SAC=20.9%, BM = PEBAX 4033 SA01/ 0.8 mils PEBAX 4033 SA01	3.00	13.05	4.349	0.020526	0.006842
5	☑	0.03000	0.03710	0.75 mils PTFE Film Cast/ Braid: 1 mil rd SS 304V ST, BW/BW, 80 PPI, BA=46.5 DEG, SAC=20.9%, BM = PEBAX 3533 SA01/ 0.8 mils PEBAX 3533 SA01	1.00	7.14	7.142	0.012500	0.012500

The Applied Force/Applied Torque modules allow the User to compute the expected strain or shear strain as a function of applied force or torque for a multisegmented design.

CathCAD® includes a comprehensive materials and braid wire database hosted on a MySQL server. The base materials library includes over sixty materials including Polyimide, PTFE, PFA, PEEK, FEP, ETFE, PeBax, Polyurethanes, Polyethylene (LDPE, MDPE, and HDPE), Grilamid, and Vestamid. The software will model Extrusion AND Film Cast materials as well as material combinations, that is, the software modelling capabilities are process independent.

CathCAD® is the SOFTWARE solution that allows the User to develop/define the construction parameters for the fabrication of composite tubing with the desired output mechanical properties.

- Construction parameters include materials and reinforcement wires (braid, coil, and/or reinforcement wires)
- Geometry includes ID, OD, and individual layer thicknesses
- Mechanical properties include flexural, axial/longitudinal, torsional rigidities and also include kink radius, tensile strength, and internal/external failure pressures.
- Supports the analysis of Single and Multilumen Designs
- The SOFTWARE includes a Fusedown Designer algorithm which may be used to precisely specify the design of the fuse down tube for braided composite tubing

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