Types of Seal

Ratings – 5= good, 1= poor. Although cost is an important criteria it's not provided as it depends on which complementary components are used to allow the seal to operate.

			Ratings							
Type	Description	Application	Solvent resistance	Pressure rating	Re-use	Usability	Dead volume	Cost	Comments	Example
Adhesive	Bonding a length of tubing to a port on the microfluidic device with epoxy or other suitable adhesive	A	1	2	1	2	2			
Flared/ flanged	the flattened surface of a tube is pressed against the flat surface of a chip	A	5	2	5	4	3			Diba
Interference fitting	Two components (ferrule and port, or connector/port) are screw or press-fit together	A	3	2	4	5	1		Resistance depends on material used. High stress loads on chip (connector/interface designed to withstand)	Luer
Push in	Tube is pushed into recess to create interference fit	A	5	1	2	4	3			Uni Cal.
Nipple/Barb	Soft wall tubing is stretched over a conical or cylindrical shaped device	A	4	2	2	3	1			Value Plastics
Needle through membrane	A needle is pushed through a typically elastomeric membrane	A	3	3	3	5	4		limited pressure range,	Cytocentrics
Gasket	Mechanical (typically Elastomer) seal compressed between two components to prevent fluid leakage. May or may not grip and seal onto a tube.	B	4	4	5	4	5		Complicated and expensive connector design	Dolomite
Ferrule	A metal or polymer ring, tube or cap, placed at or fastened to the end of a tube	B	5	4	5	3	5		Complicated to design for multiconnects. Only one component to change in the event of a seal failure	Omnifit
O-ring	An elastomer ring of circular cross-section compressed between two components to prevent fluid leakage. May or may not grip and seal onto a tube.	A	4	4	5	4	1			Generic
Free path	Introducing liquids into an open port on the microfluidic device with the use of an external delivery system such as a pipette	A	5	1	5	3	5		Possibility of leaks and spills, contamination. Discrete delivery. Lack of overpressure restricts the applicability of the microfluidic device.	?

Classes of application

A: up to 2 bar (14, 3 psig or 29 psi) to include practically all PoC, Loc like instruments for instance for biochemical testing.
B: Up to 100 bar (1450 psi) we find here many gasflow sensors etc.
C: The last are the connectors for analytical instruments like GC: up to 1000 or even 3000 bar.

Distinctive factors

- multiple interconnections
- a small area
- leak tight
- easy to assemble
- chemically resistant
- Smooth fluidic transitions, the ideal interconnect design is one that has the least possible effect on fluid flow.
- low dead volume
- low cost to assemble, and be amenable to automated assembly
- Reversibility; (Cost of servicing and flexibility of system)
- Leak rate; (Loss of fluid and entrance of bubbles)
- Maximum pressure; (High pressures need robust design of the connector)
- Change of cross-section; (influences degassing due to sudden pressure drops and carryover)
- Maximum temperature; (Choice of materials for connector/device)
- Compatibility of materials. (Influences reliability of sample and carryover)