



SAHER
FLOW SOLUTIONS

Digitizing oil fields through
innovative flow solutions



Non-intrusive

Non-radioactive

Mixer free

Min. Calibration

Introducing Microwave DMOR technology for
accurate multiphase sensing



Innovation in non-radioactive microwave sensing

Existing multiphase metering (MPM) technologies can be broadly divided in two categories i.e. radioactive and non-radioactive

Radioactive MPM

Pros:

Wide operating range
Ideal for high gas applications

Cons:

Hazardous
Long procurement times
Lengthy regulations



Non-Radioactive MPM

Pros:

Safe operation
Satisfactory performance with calibration

Cons:

Requires frequent recalibration
Process parameter dependent



Saher's microwave DMOR technology is non-radioactive and yet gives accurate multiphase sensing measurements over wide operating range – owing to its patented design combined with Digital Twin AI models



Why Saher's MPM



Non-radioactive
Safe operation



Non-intrusive
Full bore, long operational life



Minimum calibration req.
No PVT info required for phase fraction measurements



Orientation insensitive
Ease in installation and commissioning



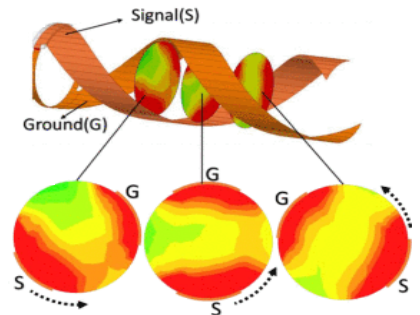
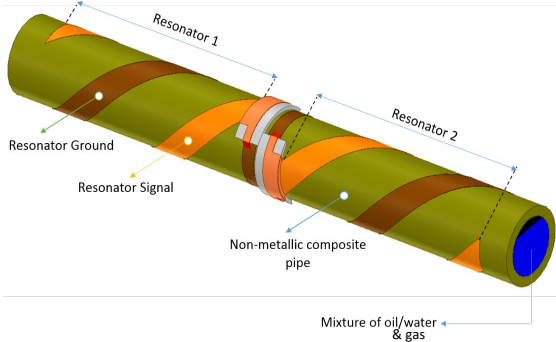
Compact design
Ease in handling



Cost effective
Superior performance in competitive price

Microwave DMOR™ Technology

Microwave cavity resonators have been in use for multiphase fraction sensing for years. However, they had a fundamental problem of exiting quasi cavity modes as an ideal cavity resonator must be closed from all ends while a pipe cannot be closed from all ends as the fluid has to pass through 2 of its ends. That is why, cavity resonators tend to suffer at high salinity conditions.



In contrast, Saher's MPM relies on dual mutually orthogonal resonators (DMOR) which are redesigned shape of a T-resonator. As the sensor design lies on outer surface of the pipe, modified T-resonator excites right modes which allows it to work even at extreme salinity conditions (200,000+ ppm). Having sensing element outside the pipe surface, allows full bore and non-intrusive sensing for longer operational life. Moreover, dual resonator spiral design, makes the E-fields to distribute evenly in the cross section of the pipe which allows orientation insensitive measurements. Combined with our proprietary Digital Twin model of the sensor, we can predict sensor's response in wide operating conditions such as varying salinity, temperature and flow regimes. AI model augmented with our innovative hardware, allows us to give robust performance without having to resort to frequent recalibration.



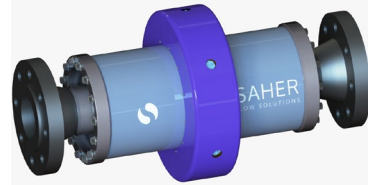
Saher Products



Water-cut sensor
(SF-200)



2-Phase Flow Meter
(SF-201)



3-Phase Meter
(SF-300)

Parameter	Value
Fluids	Oil, Water, Gas
Technology	Microwave DMOR™, DFOR™ & venturi
Output parameters	WLR, GVF, Liquid FR, Gas FR, P & T
WLR (water-liquid ratio) range / accuracy	0-100% / ±3%
GVF (Gas volume ratio) range / accuracy	0-95% / ±5%
Liquid FR (Flow rate) range	500-24,000 bpd (3-160 m ³ /hr)
Gas FR (Flow rate) range	0-620 m ³ /hr (at Actual conditions)
Max. process Temp/Pressure	125°C / 2000 psi (Higher on request)
Pipe Size	2"-8" (Higher on request)
Power Supply	110-220V _{ac} / As per regional requirements
Communication	Wi-Fi (LAN), Modbus RTU RS 485, 4G, Satellite
Hazardous area approvals	IECEX/ATEX Class 1, Zone 1 & 2



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