



**SAHER**  
FLOW SOLUTIONS

Digitizing oil fields through  
innovative flow solutions



Non-intrusive

Non-Gamma

Mixer free

Min. Calibration

Introducing Microwave DMOR technology for  
accurate multiphase sensing



# Innovation in non-gamma microwave sensing

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

## Gamma based MPFM

### Pros:

Industry standard  
Easy to get IECEx approved

### Cons:

Always-on radiation  
Long procurement times  
Disposal issues after lifetime

## Non-Gamma MPFM

### Pros:

Safe operation  
No radiation or radiation only during operation

### Cons:

Challenging IECEx certification  
Process dependency



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



## Why Saher's MPFM



### **Non-gamma**

Safe operation



### **Non-intrusive**

Full bore, long operational life



### **Minimum calibration req.**

Requires minimalistic calibration owing to its AI model



### **Orientation insensitive**

Ease in installation and commissioning



### **Compact design**

Ease in handling

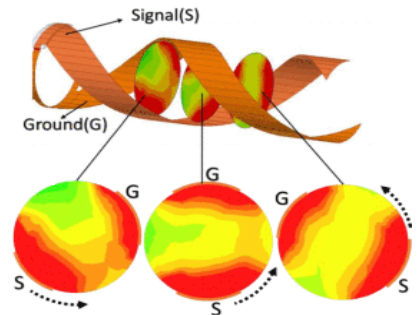
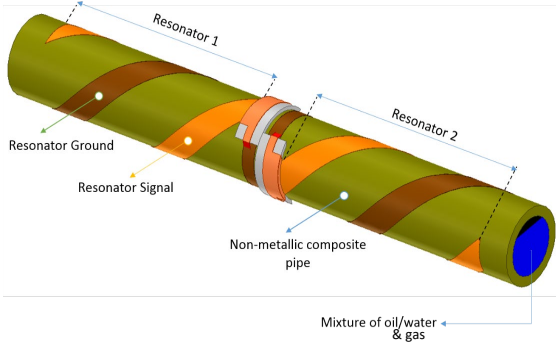


### **Cost effective**

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.



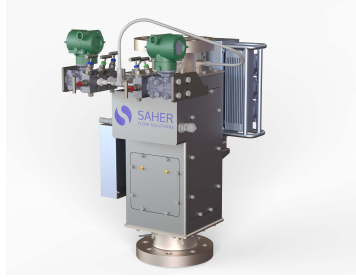
In contrast, Saher's MPM relies on dual mutually orthogonal resonators (DMOR) which are redesigned shape of a T-resonator. As the sensor design lies on outer surface of the pipe, modified T-resonator excites right modes which allows it to work even at extreme salinity conditions (200,000+ ppm). Having 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



3-Phase water-cut sensor  
(SF-321)



3-Phase Multi Phase Flow Meter  
(SF-331)



Skid Mounted MPFM  
(SK-100)

Parameter	Value
Fluids	Oil, Water, Gas
Technology	Microwave DMOR™, DFOR™, Digital twin AI & 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	250-24,000 bpd (1.5-160 m <sup>3</sup> /hr)
Gas FR (Flow rate) range	0-10 MMSCFD
Max. process Temp/Pressure	125°C / 2000 psi (Higher on request)
Pipe Size	2"-8" (Higher on request)
Power Supply	110-220V <sub>ac</sub> / As per regional requirements
Communication	Wi-Fi (LAN), Modbus RTU RS 485
Hazardous area approvals	IECEX/ATEX Class 1, Zone 1 & 2



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