

HFPME

High Frequency Pressure Monitor & Evaluation

Real-Time Fracturing Evaluation — Zero Downhole Equipment

HFPME is the only commercially deployed technology that delivers stage-by-stage fracturing evaluation in real time—with zero downhole intervention. Installed at the wellhead in under one hour, it captures high-frequency pressure signals from 1,000 Hz to 20,000 Hz and transforms them into actionable completion intelligence: fracture efficiency scores, SRV quantification, cluster-level contribution maps, and optimization recommendations—all while the job is still running. Applicable to both propped fracturing and acid fracturing operations (not suitable for matrix acidizing).

At a Glance

400+ Wells	5,000+ Stages	0 Downhole Tools	1-Hour Deployment
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How It Works

During hydraulic fracturing, HFPME installs a high-precision pressure sensor at the wellhead Christmas tree. The sensor captures pressure waves generated by downhole fracture events at a 1–20 kHz sampling rate—1,000× faster than conventional gauges. Three integrated analytical methods—cepstral analysis for fracture initiation location, well testing interpretation for fracture parameters, and unstructured-grid reservoir numerical simulation for SRV—work together on a cloud-based analytics platform powered by 90,000+ type-curve models (USTC), delivering:

- **Stage Scorecard** — Per-stage fracture efficiency scoring (initiation quality, fluid uniformity, SRV—core SRV, secondary SRV, fracture network coefficient, and SRV permeability)
- **Cluster Map** — Cluster-level production contribution heat map with dumb cluster identification
- **Risk Alerts** — Real-time alerts for screenout risk, casing deformation, and inter-stage communication
- **Optimization Advice** — Actionable recommendations on cluster spacing, fluid intensity, and diverter strategy

Technical Specifications

Parameter	Specification
Pressure Range	0–175 MPa (25,400 psi)
Accuracy	0.0001 MPa (0.0145 psi)
Sampling Rate	1–20 kHz (1,000× conventional)
Installation	Wellhead only — no downhole cable, no downhole equipment
Data Delivery	Real-time cloud analytics; initial report within 24–72 hours
Per-Well Price Cap	Per-well cap applies regardless of stage count
Applicable Operations	Propped fracturing  · Acid fracturing  · Matrix acidizing 

Value to Producers

Value Driver	Mechanism	Typical Impact
Dumb Cluster Identification	Pinpoint 20–30% of clusters consuming fluid but not producing	15–30% IP increase
Stage Optimization	Eliminate ineffective stages; re-allocate fluid and proppant	Significant per-well cost savings
Risk Mitigation	10–30 second early warning for screenout and casing deformation	Accident rate <1% (vs. 5–8%)
Production Enhancement	Precision fracturing guided by real-time data extends stable production	3–5% recovery factor improvement
Accelerated Development	No monitoring well drilling or downhole cable deployment needed	15–30 days faster time-to-first-oil
SRV Quantification	Numerical simulation delivers core SRV, secondary SRV, fracture network coefficient, and SRV permeability per stage	Direct input for productivity prediction and field development planning

Proven Results: Halfaya Oilfield, Iraq

Halfaya Oilfield, CNPC's flagship asset in southern Iraq, is a low-permeability sandstone reservoir with 12–15 fracturing stages per well. Since 2024, HFPME has been deployed across pilot wells with the following verified outcomes:

Metric	Result
Monitoring Cost Savings	Up to 30% lower vs. downhole microseismic monitoring
Production Increase	29.2% IP uplift (62 bopd vs. 48 bopd offset wells)
Operational Efficiency	Average fracturing time per stage reduced from 2.5 h to 2.0 h
Safety Record	168 stages across 12 wells — zero screenouts or casing deformations
Cumulative Benefit per Well	Multi-million dollar per well (monitoring savings + time savings + production + risk avoidance)

Commercial Terms

- **Per-Stage Fee:** Competitive per-stage pricing — includes sensor deployment and real-time data acquisition, and full analytics
- **Price Cap:** Per-well price cap regardless of stage count—cost certainty for multi-stage horizontal wells
- **Pilot Well:** First well deployed at no cost—the operator only provides wellhead access and fracturing cooperation

Next Steps

We welcome the opportunity to conduct a technical presentation tailored to your reservoir conditions, followed by a no-cost pilot well deployment. Our team is available to discuss the schedule, selection criteria, and data security arrangements at your convenience.