

Maximizing the efficiency of custody transfer measurement.

Brodie BiRotor Plus: The best-in-class custody transfer meter

BiRotor Plus Meter

Applied in custody transfer of petroleum products, the BiRotor Plus provides outstanding service. With a compact, lightweight construction, flexibility of vertical or horizontal mounting & extremely low pressure drop, the BiRotor Plus is pre-eminent meter of choice.

The double-case design incorporating dual helical rotors combines the rugged durability and long service life of the traditional BiRotor meter with the improved accuracy and reliable pulse output demanded by today's industry requirements.

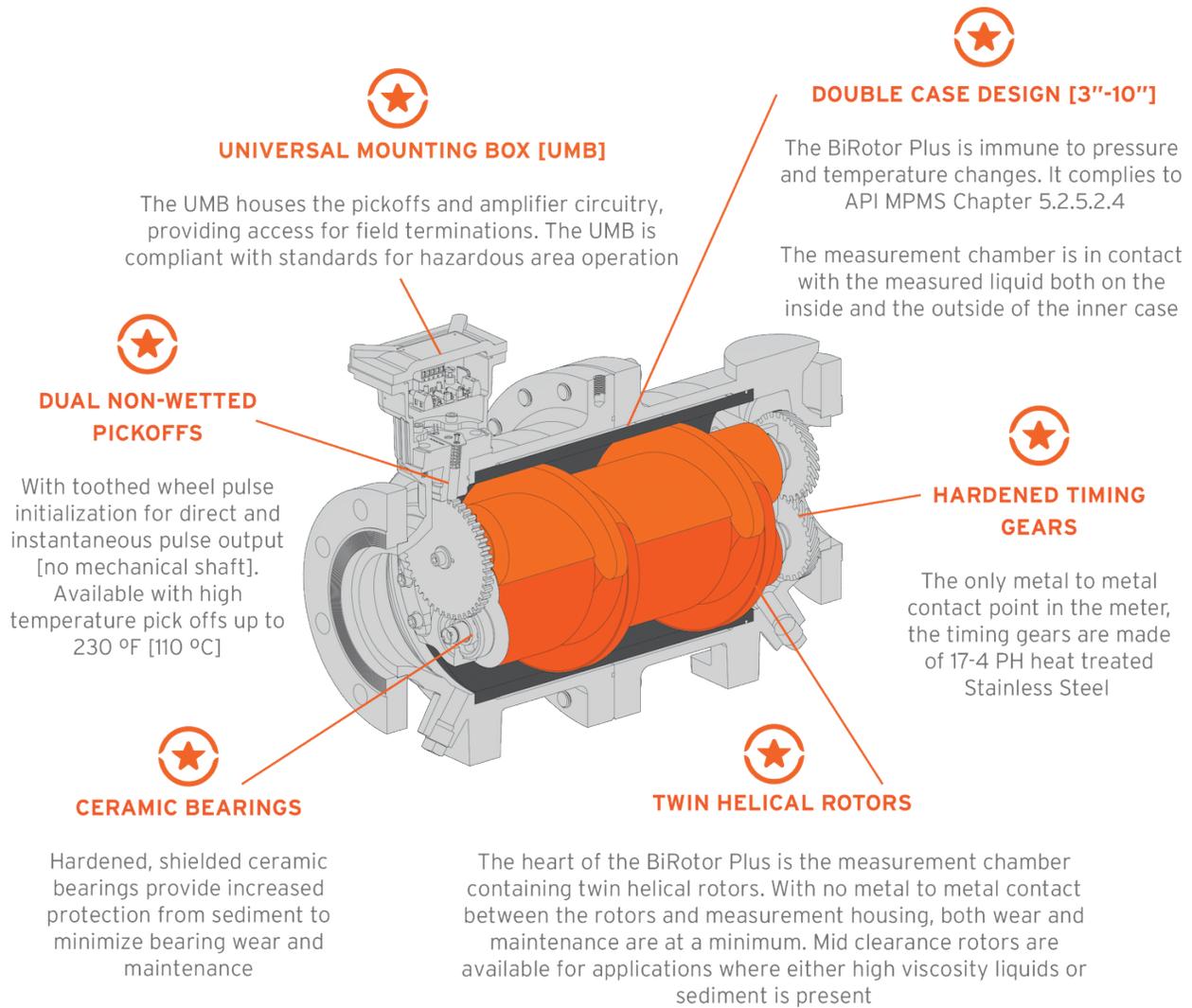
The best-in-class BiRotor Plus meter is proven in challenging applications such as new age crude oil extraction and refined product pipelines where DRA is present, providing both excellent performance whilst solving end-user challenges where other measurement technologies have failed to produce long-term success.



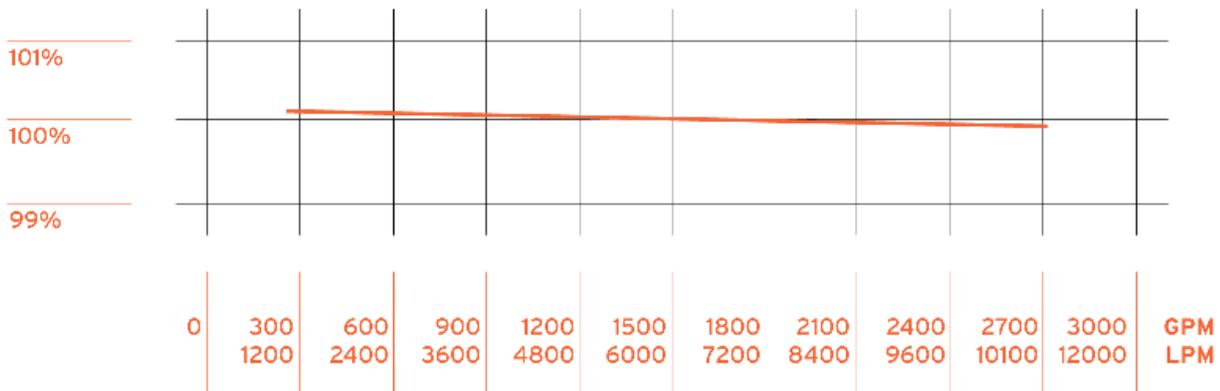
"In refined products service, the BR+ meter's repeatability and linearity is by far better than any other meter on the market"
Measurement Director -
Major US energy corporation



Design Features



Unrivalled Performance



Application Flexibility

Marketing Terminals



Refined Product Pipelines



Crude Oil Transfer



Feedstock Import Measurement



Renewable Fuels Blending



Aviation Refueling



Bunkering



Offloading



Case Study-

Multi viscose applications.

One of the largest crude oil import terminals in the US has a feedstock that includes products from many different world areas, resulting in a wide range of viscosities and qualities being received at the metering station.

Accepting this station would provide certain viscosity/quality related measurement challenges, the originally selected flow meters, included Multi Viscosity in its brand name.



Underwhelmed by performance, the end user, a major US energy company already familiar with the BiRotor Plus in their marketing terminals, reached out to Brodie to discuss the challenge and as a result installed 16" (F16) BiRotor Plus meters as direct replacements.

In a follow up review of the metering station performance since upgrading the flowmeters, the project manager commented *"The BiRotor Plus are working great, everybody is happy."*

A senior measurement engineer added *"Actually, they are operating beyond our expectations."*

Case Study-

Combating the effects of DRA (Drag Reducing Agent) in pipelines.

The Challenge

After installing DRA systems across their arterial infrastructure to reduce energy costs, a major pipeline and terminal operator, based in Southeast region of the US, faced issues with measuring DRA injected refined products with conventional and helical turbine meters.

Strategic approach

The pipeline company had installed a helical turbine meter on a trial basis to overcome the negative effects of DRA, achieving little success, so they reached out to Brodie International for advice and input. Brodie was in the test phase of a new 8 inch BiRotor Plus meter (B311C), with a BETA test unit having recently completed successful testing at the NMI flow laboratory in East Kilbride, Scotland. These tests included measurement comparisons versus standards on varying liquids with viscosities ranging from 2 cSt to 800 cSt, during which the performance of this meter displayed a near linear accuracy curve regardless of test liquid viscosity. Brodie felt that this new meter would be a good solution for the issues experienced by the pipeline operator and supplied a unit for field trial and evaluation purposes.

Evaluating the benefits



The B311C BETA meter was initially installed in a pipeline metering site which is subjected to a DRA saturation of 5 PPM. This is generally the lowest rate of injection, but this dosing level, had a significant adverse effect on the linearity and repeatability of the turbine & helical meters, resulting in system performance drifting outside of the acceptable measurement tolerances.

The newly installed Brodie meter was proved several times per day to provide as much operational data as possible over a short time frame. Immediate system balance benefits were visible with both linearity and repeatability of the meter falling comfortably within permissible tolerances.

After receiving positive results for the trial and evaluation exercise in the first location, Brodie received a request from

the pipeline operator to relocate this meter to another location where the DRA was injected at 15PPM, the maximum permissible rate. This dosing percentage resulted in the most erratic performance from the legacy meters and was viewed as an ultimate test of the BiRotor Plus' durability to handle difficult process challenges.

The newly installed meter was proved several times per day using an in-line small volume prover, with the resulting proving data supporting the belief that the Bi-Rotor Plus meters are virtually unaffected by viscosity or changes in process gravity.

Customer Feedback

"Overall, we were very pleased with the performance of the meter. The Brodie 8" meter not only had great repeatability but the linearity was absolutely amazing. Truly amazing considering the high DRA concentration."

Case Study- "Chews through paraffin"

Measuring crude oil containing high paraffin wax content.

In the summer of 2016, a pipeline operator in the Midwest was experiencing some challenges with the incumbent Inference type meters installed in their system.

Every four to six weeks, the meters' performance would drift to a point where the meter factor was outside of the permissible tolerances. The remedial action was to bypass and remove the meter, apply steam to the inlet to loosen the build up of waxy paraffin on the vibrating tubes, flush with hot kerosene to clean, reinstall the meter, then re-prove.



The pipeline operator reached out to Brodie with his challenge and was offered a BiRotor Plus for the purpose of trial and evaluation. The unique design of the BR+ means that the rotation of helical rotors negates the possibility of a build up and with only two moving parts, has a very low maintenance threshold.

On a visit to the installation in early 2017, a pipeline technician was asked about his experiences with the BiRotor Plus compared to the previous meter?

"Man, that thing just chews through paraffin".....a marketing campaign was born!

Today, this BiRotor Plus and many more, in worldwide upstream applications are providing excellent, accurate and reliable service.

The morale of the story is to really dig deep on your research when a manufacturer tells you that their technology is "maintenance free".

Things are not always as they seem!

Brodie BiRotor Plus - Providing a sustainable solution in difficult applications where alternate technologies have failed to provide measurement stability.

Ensuring measurement excellence.

The enhanced performance of Brodie's industry preferred BiRotor Plus family of meters has driven an increased use as a master meter for many differing applications.

Unrivalled linearity, unmatched repeatability with viscosity changes having little influence on meter factors, the BiRotor Plus is a pre-eminent choice as a reference device.

From portable reference meters for load rack meters, to master meters for offshore metering station, to its inclusion on Compact & Small Volume provers, the options are endless.



Technical Specifications

		A Series	B Series	C Series	
Base Model Code		SB25x	B27X	B28X	B29X
Line Size & End Connections		2" ANSI 150#/300#	3" ANSI 150#/300#	4" ANSI150#/300#/600#	6" ANSI 150#/300#
Flow Range					
	Standard	15-150 GPM (57-568LPM)	43-425 GPM (163-1609LPM)	70-700 GPM (265-2650LPM)	100-1000 GPM (379-3785 LPM)
Max Working Pressure @100F (38C)	ANSI 150	275 PSI (19 Bar)	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)
	ANSI 300	720 PSI (50 Bar)	740 PSI (51 Bar)	740 PSI (51 Bar)	740 PSI (51 Bar)
	ANSI 600			1480 PSI (102 Bar)	
Pressure Code		B31.3/SEP/PED	B31.3/SEP/PED	B31.3/SEP/PED	B31.3/SEP/PED
Linearity		±0.15%	±0.10%	±0.075%	±0.075%
Repeatability		0.02%	0.02%	0.02%	0.02%
Nominal K-Factor		950 P/Gal (250 P/L)	160 P/Gal (42 P/L)	96 P/Gal (25 P/L)	96 P/Gal (25 P/L)
Weights & Measures		OIML R117/MID system cert			
Material	Meter Housing	SS	Steel	Steel	Steel

		D Series	E1 Series		E2 Series		F Series		
Base Model Code		B30X	B31X	B32X	B33X	B34X	B35X	B36X	B38X
Line Size & End Connections		6" ANSI 150#/300#/600#	8" ANSI 150#/300#/600#	10" ANSI 150#/300#/600#	10" ANSI 150#/300#/600#	12" ANSI 150#/300#/600#	10" ANSI 150#/300#/600#	12" ANSI 150#/300#/600#	16" ANSI 150#/300#/600#
Flow Range									
	Standard	250-2497 BPH (39-397 m3/hr)	329-3285 BPH (52-522 m3/hr)	357-3571 BPH (56-567 m3/hr)	500-5000 BPH (79-795m3/hr)	500-5000 BPH (79-795m3/hr)	582-5820 BPH (93-925 m3/hr)	787-7865 BPH (125-1250m3/hr)	1300-13,000 BPH (207-2066 m3/hr))
Max Working Pressure @100F (38C)	ANSI 150	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)	285 PSI (19.5 Bar)
	ANSI 300	740 PSI (51 Bar)	740 PSI (51 Bar)	740 PSI (51 Bar)	740 PSI (51 Bar)	740 PSI (51 Bar)	740 PSI (51 Bar)	740 PSI (51 Bar)	740 PSI (51 Bar)
	ANSI 600	1480 PSI (102 Bar)	1480 PSI (102 Bar)	1480 PSI (102 Bar)	1480 PSI (102 Bar)	1480 PSI (102 Bar)	1480 PSI (102 Bar)	1480 PSI (102 Bar)	1480 PSI (102 Bar)
Pressure Code		B31.3/PED	B31.3/PED	B31.3/PED	B31.3/PED	B31.3/PED	B31.3/PED	B31.3/PED	B31.3/PED
Linearity		±0.15%	±0.15%	±0.15%	±0.15%	±0.15%	±0.15%	±0.15%	±0.15%
Repeatability		0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
Nominal K-Factor		1680 P/BBL (10,566P/m3)	1681 P/BBL (10,566P/m3)	1682 P/BBL (10,566P/m3)	1150 P/BBL (7233 P/m3)	1150 P/BBL (7233 P/m3)	579P/BBL (3642 P/m3)	579P/BBL (3642 P/m3)	335 P/B (2106 P/m3)
Weights & Measures		OIML R117/MID system cert	OIML R117/MID system cert	OIML R117/MID system cert	OIML R117/MID system cert	OIML R117/MID system cert	OIML R117/MID system cert	OIML R117/MID system cert	OIML R117/MID system cert
Material	Meter Housing	Steel	Steel	Steel	Steel	Steel	Steel	Steel	Steel



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