



A+ FLOWTEK

Balanced Flow Meter

Patent No. US 7,051,765 B1

BFM

BALANCED FLOW METER

NASA Invention of the Year

PLATE APPLICATIONS



A+ FLOWTEK

Balanced Flow Meter

Patent No. US 7,051,765 B1

A+ Multi-Holed Balance Flow Meter (BFM) and Balanced-RO (BRO) Benefits:

- Flow Error < 0.25%
- Repeatability Error < 0.1%
- < 1 D Upstream and Downstream Fitting Requirements
- Uniform Pipe Velocity and Pressure Profiles
- No Harmful Eddies and Vibrations
- Designed for Single or 2-Phase Flows
- Thick Plate to Handle dP Stresses and Longer Life
- Over 10x Life of Single-Holed Thin Plate
- Higher Tolerance to Erosion and Cavitation
- Each Plate Custom Designed for Your Unique Process
- 10x Reduction in Noise Power
- Plate Noise <85 dB with Patented Hole Designs
- High Hole Mach Numbers
- Pipe Erosion Virtually Eliminated
- Rugged and Durable Compared To Thin Plates
- Self Draining or Venting Plate Design
- Lower Pipe Noise, Thrusts and Vibrations
- Robust Mechanical Design, Can Be Designed To Handle Hydraulic Transients/Hammer
- Any Materials
- Thousands of Successful Applications



A+ FLOWTEK

Balanced Flow Meter

Patent No. US 7,051,765 B1

SN40000000

NASA / MSFC Marshall Space Flight Center

Application: Liquid oxygen sample plate





A+ FLOWTEK

Balanced Flow Meter

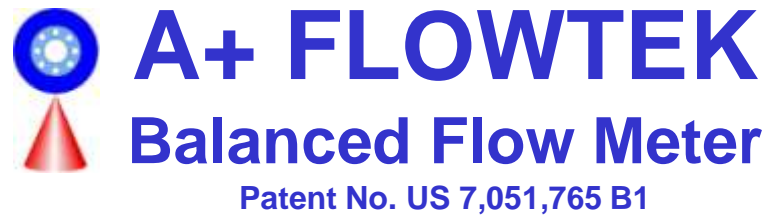
Patent No. US 7,051,765 B1

SN40150003

18 inch, 0.25" thick, Beta 0.568150

Application: Off-gas with fouling





SN42260001

3 inch, 100mm thick, Beta 0.814700
Application: Saturated liquid hydrocarbons





A+ FLOWTEK

Balanced Flow Meter

Patent No. US 7,051,765 B1

SN50410001

6 inch, 6.00" thick, Beta 0.670500

Application: High viscosity polymer melt





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN50410002

6 inch, 0.25" thick, Beta 0.752400

Application: Chilled cooling water loop and silencer





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN51380001-2

8 inch, 0.25" thick, Beta 0.593

Application: Refinery hydrocarbon liquid





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN52420002

12 inch, 0.375" thick, Beta 0.85, RMS
Application: Medium pressure steam





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Balanced Flow Meter


Patent No. US 7,051,765 B1

SN53620003

3 inch, 0.25" thick, Beta 0.4469

**Application: Hydrocarbon liquid for cavitation suppression
restriction orifice plate; pump bypass**




 **A+ FLOWTEK**
Balanced Flow Meter
Patent No. US 7,051,765 B1

SN60480002

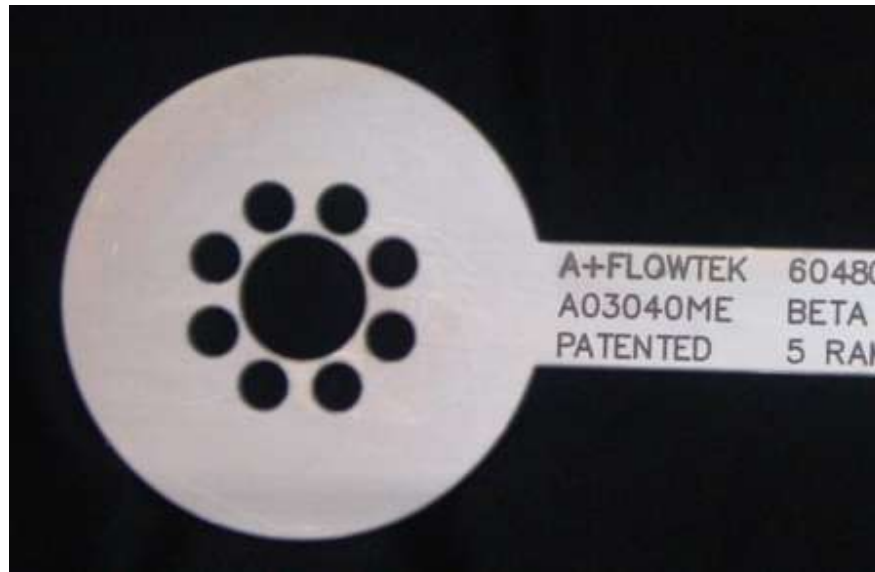
6 inch, 0.25" thick, Beta 0.63390
Application: High pressure steam



 **A+ FLOWTEK**
Balanced Flow Meter
Patent No. US 7,051,765 B1

SN60480003

3 inch, 0.25" thick, Beta 0.70386
Application: High pressure steam





A+ FLOWTEK

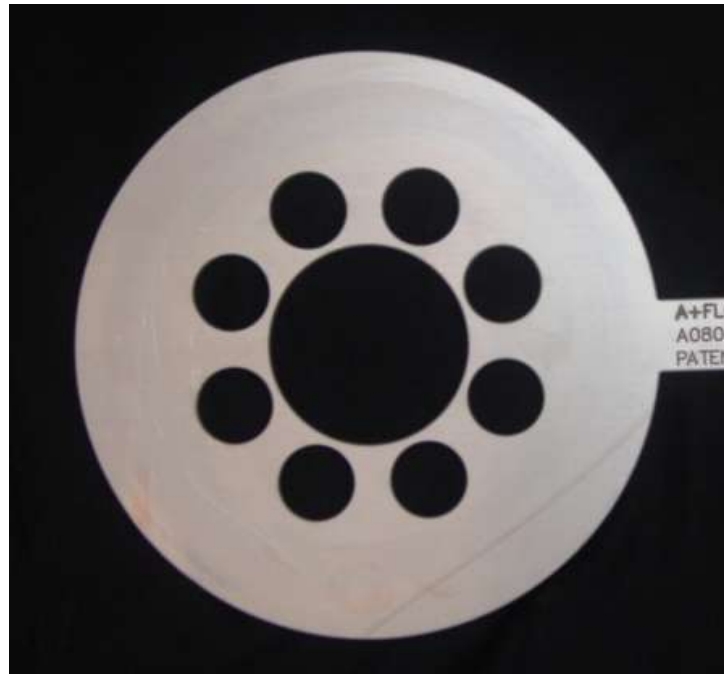
Balanced Flow Meter

Patent No. US 7,051,765 B1

SN60480005

8 inch, 0.25" thick, Beta 0.74813

Application: High pressure steam





A+ FLOWTEK

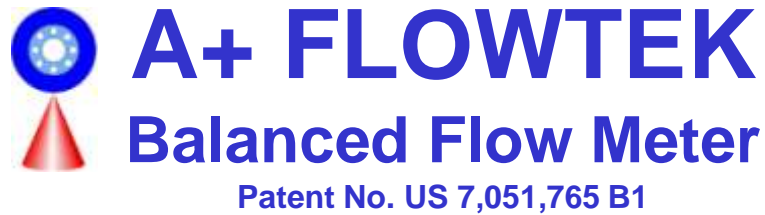
Balanced Flow Meter

Patent No. US 7,051,765 B1

SN60530001

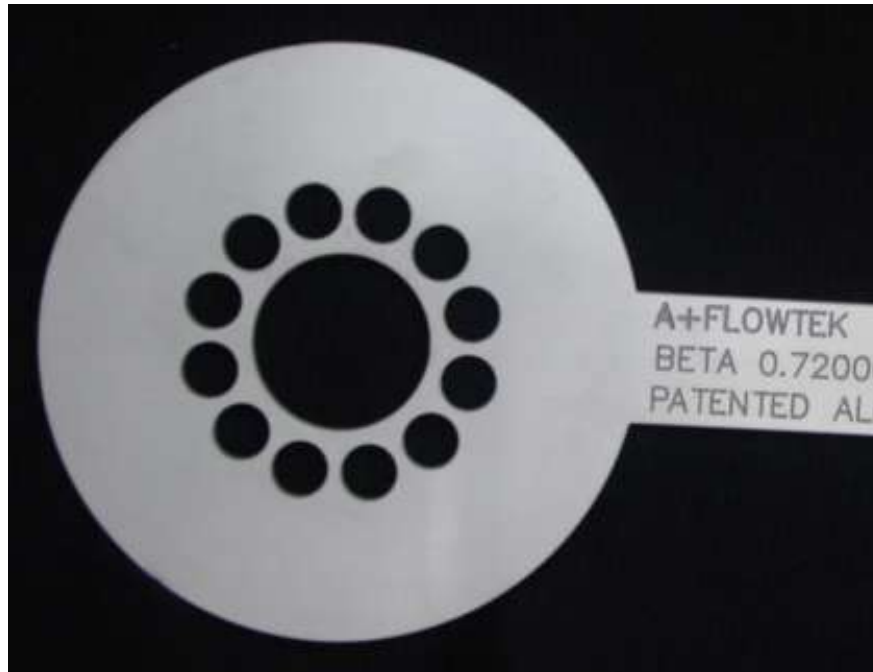
8 inch, 0.5" thick, Beta 0.77318, Ring Joint Flange
Application: Well head gas and condensate flow
(high pressure 2-phase flow)





SN60890002

4 inch, 0.25" thick, Beta 0.72000
Application: Air compressor stream





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN60890006

8 inch, 0.25" thick, Beta 0.52000

Application: Air compressor stream





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Balanced Flow Meter

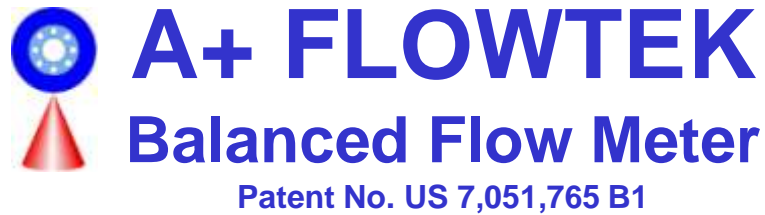
Patent No. US 7,051,765 B1

SN61360001

8 inch, 0.25" thick, Beta 0.83008

Application: Steam





SN61710004

8 inch, 0.25" thick, Beta 0.5
Application: Space Shuttle Program





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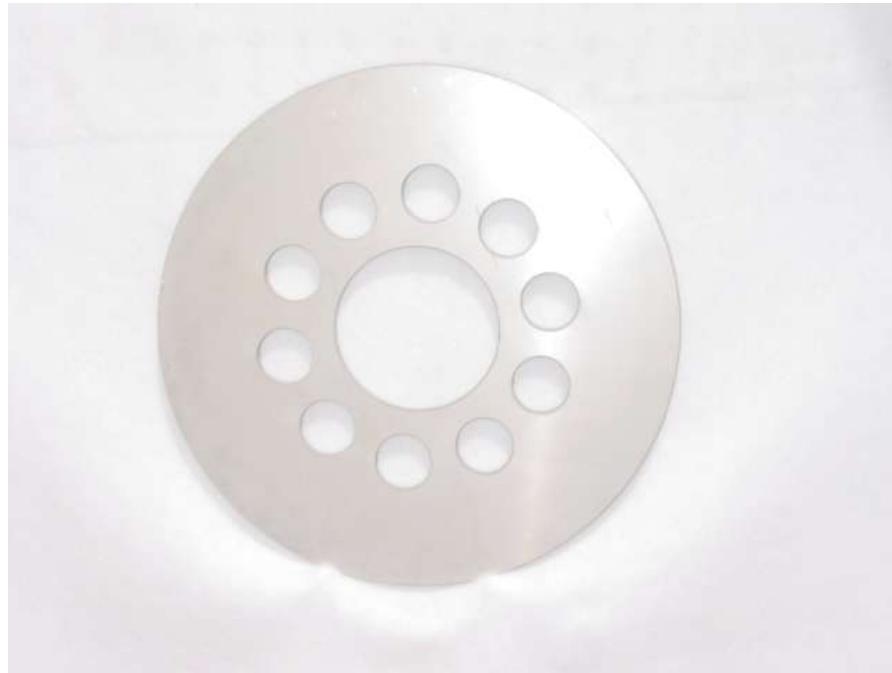
Balanced Flow Meter

Patent No. US 7,051,765 B1

SN61710005

8 inch, 0.25" thick, Beta 0.65

Application: Space Shuttle Program





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN61710006

8 inch, 0.25" thick, Beta 0.8

Application: Space Shuttle Program





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Balanced Flow Meter


Patent No. US 7,051,765 B1

SN61710007

4 inch, 0.25" thick, Beta 0.5

Application: Space Shuttle Program



 **A+ FLOWTEK**
Balanced Flow Meter
Patent No. US 7,051,765 B1

SN61710009

4 inch, 0.25" thick, Beta 0.7
Application: Space Shuttle Program





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN61710011

8 inch, 0.25" thick, Beta 0.65

Application: Space Shuttle Program





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN61710012

8 inch, 0.25" thick, Beta 0.7

Application: Space Shuttle Program





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Balanced Flow Meter


Patent No. US 7,051,765 B1

SN61880001

4 inch, 4.00" thick, Beta 0.77672

Application: Effluent recycle



 **A+ FLOWTEK**
Balanced Flow Meter
Patent No. US 7,051,765 B1

SN62130001

4 inch, 0.25" thick, Beta 0.84476
Application: Compressor discharge





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN62260001

**8 inch, 0.50" thick, Beta 0.86068, Contoured
Application: Boiler gas feed**





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN62270001

8 inch, 0.25" thick, Beta 0.64755

Application: Compressor discharge





A+ FLOWTEK

Balanced Flow Meter

Patent No. US 7,051,765 B1

SN62410001

4 inch", 0.25" thick

Application: Restriction orifice





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN62540001

4 inch, 0.25" thick, Beta 0.71446

Application: Air compressor





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN62830001

6 inch, 0.25" thick, Beta 0.50075

Application: Ammonia





A+ FLOWTEK

Balanced Flow Meter

Patent No. US 7,051,765 B1

SN63130002

4 inch, 0.25" thick, Beta 0.74203

Application: Light oil steam





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN63130003

3 inch, 0.25" thick, Beta 0.77945

Application: Ramp steam





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN63130005

8 inch, 0.25" thick, Beta 0.84811

Application: North loop steam





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN63490005

**2 inch, 0.50" thick, Beta 0.71988, Contoured
Application: Liquid**





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN63550001

2 inch, 0.50" thick, Beta 0.72000, Contoured
Application: LOx / Methane





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN70090001

**4 inch, 0.50" thick, Beta 0.78688, Contoured
Application: Liquid**





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN70180001

2 inch, 0.50" thick, Beta 0.5

Application: Air





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN70250004

12 inch, 0.25" thick, Beta 0.63539

Application: Liquid





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN70360001

4 inch, 4.00" thick, Beta 0.77672

Application: Effluent recycle





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN70660001

8 inch, 0.25" thick, Beta 0.83280

Application: Coke vapor stream





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN71840001

16 inch, 0.50" thick, Beta 0.69463, RMS
Application: Chlorine





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN72000002

4 inch, 0.25" thick, Beta 0.6

Application: Steam





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN72070002

8 inch, 0.25" thick, Beta 0.6

Application: Air compressor





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN72530001

1.25 inch, 0.50" thick, Beta 0.7002, Contoured
Application: Rocket fluids





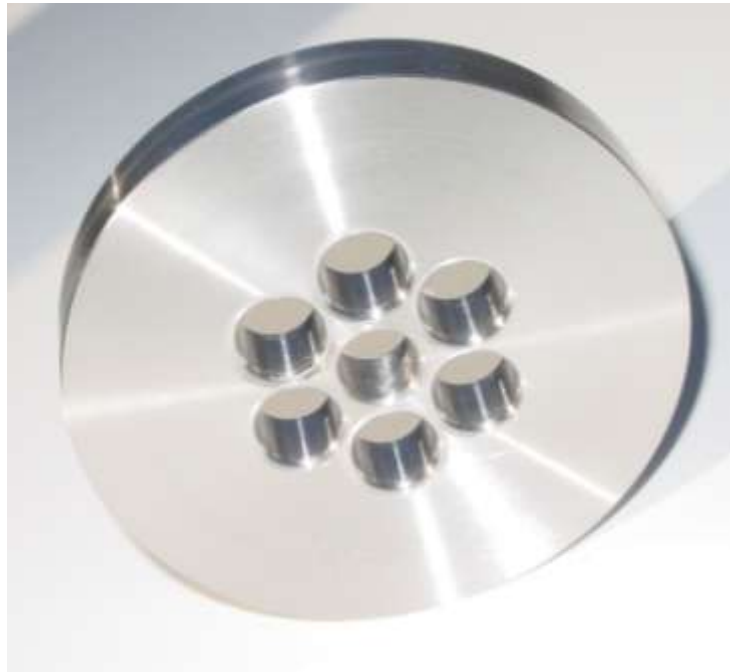
A+ FLOWTEK

Balanced Flow Meter

Patent No. US 7,051,765 B1

SN72760001

**4 inch, 0.50" thick, Beta 0.70201, Contoured
Application: Nuclear Master Meter**





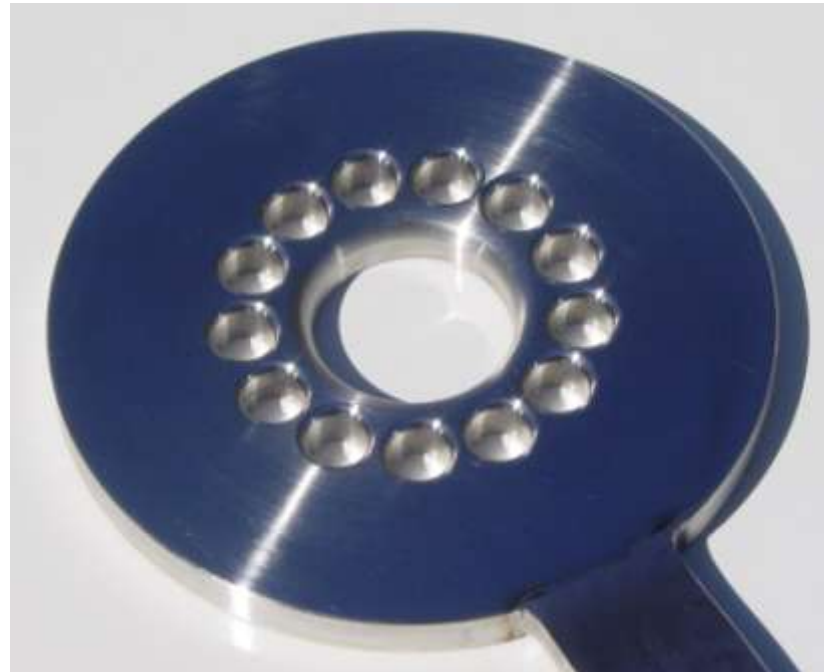
A+ FLOWTEK

Balanced Flow Meter

Patent No. US 7,051,765 B1

SN73110001

4 inch, 0.50" thick, Beta 0.72, Contoured
Application: Liquid





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN73200001

10 inch, 0.25" thick, Beta 0.26027, Contoured
Application: Acetylene





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN73330001

6 inch, 0.50" thick, Beta 0.72, Contoured

Application: Compressor surge control, Critical flow





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN73390001

12 inch, 0.50" thick, Beta 0.69713, Contoured
Application: Thermal incinerator feed





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN73410001

**6 inch, 0.50" thick, Beta 0.72 +/- 1 mil, Contoured
Application: Critical reactor recycle**





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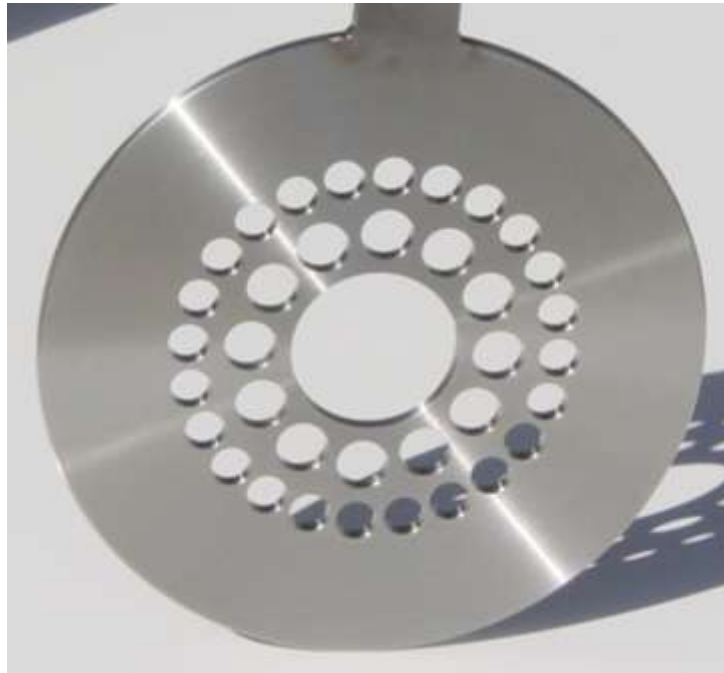
Balanced Flow Meter

Patent No. US 7,051,765 B1

SN73410002

6 inch, 0.25" thick, Beta 0.7524

Application: Critical reactor recycle





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN73600002

2 inch, 3.00" thick, Beta 0.6, Spool

Application: Lethal service





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN80080002

16 inch, 0.25" thick, Beta 0.85188

Application: Para formaldehyde





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN80090001

**14 inch, 0.50" thick, Beta 0.36047, Bi-directional, Contoured,
Self-centering/aligning - Application: Chlorine**





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN80150001

4 inch, 0.25" thick, Beta 0.61341, Contoured
Application: Hydrocarbon liquid





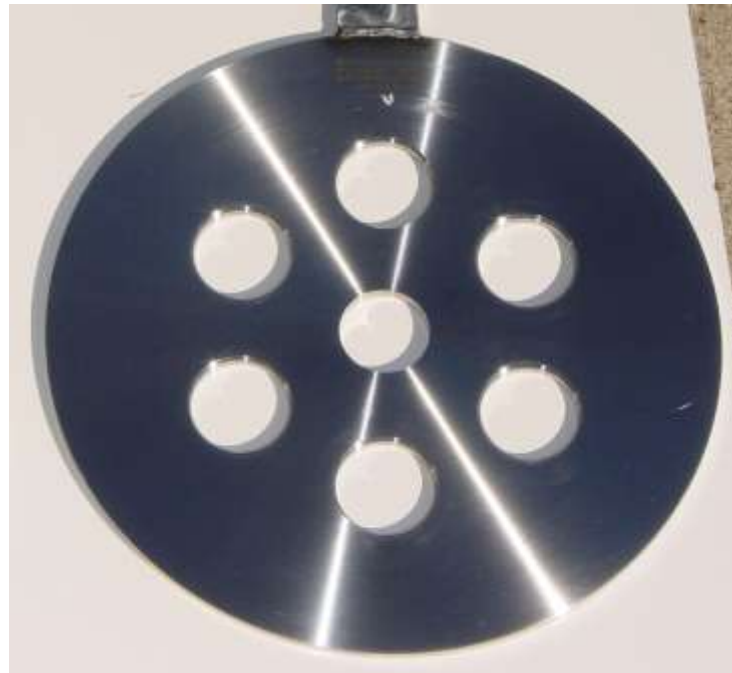
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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN80150005

8 inch, 0.25" thick, Beta 0.56656
Application: Hydrocarbon liquid





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN80160001

4 inch, 4.00" thick, Beta 0.77672

Application: Air compressor discharge flange





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN80950001

8 inch, 0.50" thick, Beta 0.61635, Contoured
Application: Air





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN81020001

2 inch, 3.00" thick, Beta 0.47909

Application: Power Turbine Liquid Fuel





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN81160002

**4 inch, 0.50" thick, Beta 0.56806, Contoured
Application: Air**





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN81280001

6 inch, 0.50" thick, Beta 0.22, Hastelloy C, Restriction, Beveled
Application: Liquid – RO w/Hydraulic hammer limiter





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Balanced Flow Meter

Patent No. US 7,051,765 B1

SN81350001

10 inch, 0.50" thick, Beta 0.72, Contoured
Application: Liquid – Effluent pump

