

# Series 2

# TOUGH® PUMP

- Sizes:**
- 8.9 GPM
  - 10.8 GPM
  - 12.9 GPM
  - 15.8 GPM

**Excellent Durability**

Patent Pending



**23.0 GPM**  
Larger Inlet, 1.085" Inside Diameter



## **TOUGH® BECAUSE:**

### Proven One Piece Gear-Shaft

High alloy steel, case hardened, precision ground, then proprietary coated. Does not allow any radial movement of the gear on the shaft, thus maintaining correct clearance between the gear teeth tips and the housing. A two piece gear and shaft introduces more tolerance, which can allow the tips to scrape the gear cavity walls. Our one piece design enables our pump to ingest dirt and spit it out that would fail other pumps.

### Rock Solid Housing

Evolved through housing deflection vs pressure tests. Series 2 final design is the strongest in the industry, combined with twelve 1/4-28 studs to super secure the extra rigid cover. MIL-Spec hard coated to +/- .0001" tolerance for consistent flow over a very long life. Good to 400 PSI; higher available.

### Steady Flow at EXTREME RPM

Special internal design features to feed the fuel to the gears gives EXCELLENT top-end performance.... up to 5,000 pump RPM (10,000 engine RPM) without cavitation. Our larger diameter roller bearings are rated at higher load (output pressure).

### Pressure Balance Plate System

Our gear side plates are high alloy steel, heat treated very hard, ground to a 6 micro-inch finish, with end-to-end flatness of .0001". These are coated with a harder-than-carbide composite, then lapped to a 2 micro-inch mirror finish. This coating is so smooth that the torque required to drive the pump is significantly reduced. One plate is moveable. It has pump outlet pressure fed under it to keep it in constant contact with the gear faces, which gives minimum pump output flow drop vs pressure, and compensates for housing expansion due to temperature, and wear. For excellent priming during engine cranking, a compression o-ring keeps the plate in contact with the gear faces.



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# Series 2 TOUGH PUMP®

Pump Flows are in lb/hr & GPM  
 Flowed Using Methanol: .795 specific gravity at 70°F  
 Flows are at Pump Shaft RPM, --- NOT Engine RPM.

Pump RPM		Pump Sizes				
		900	1100	1300	1600	2300*
2000 at 5 PSI	lbs/hr	1819	2199	2590		20AN Inlet
	GPM	4.57	5.52	6.51		
2000 at 50 PSI	lbs/hr	1787	2174	2580	3174	4612
	GPM	4.49	5.46	6.48	7.97	11.58
2000 at 100 PSI	lbs/hr	1755	2144	2555	3145	4570
	GPM	4.41	5.39	6.42	7.90	11.48
2000 at 150 PSI	lbs/hr	1731	2113	2530	3117	4529
	GPM	4.35	5.31	6.36	7.83	11.38
3500 at 100 PSI	lbs/hr	3089	3773	4497	5504	7997
	GPM	7.76	9.48	11.30	13.82	20.09
4000 at 100 PSI	lbs/hr	3528	4309	5136	6290	9139
	GPM	8.86	10.82	12.90	15.80	23.00

Inlet and outlet bolt-on fittings allow a larger diameter inlet port for better flow and keeps the housing strong because it isn't tapped for a large fitting thread.



**Safety:**  
 To prevent pressure from reaching the shaft seal, pump pressure is not allowed to enter the lip seal

chamber. Around the drive shaft is sealed to the housing and to the moveable plate by o-ring. This reduces the possibility of a seal leak and reduces friction on the drive shaft, because pressure is not forcing the seal lip to grip down onto the shaft... gives longer seal life and a reduction in required drive torque. The seal cavity is vented back to the inlet side of the pump to further insure that there is no pressure on the seal. A snap ring positively locates the seal.



\* Larger Inlet Mount Flange on 20AN. Only for use with 2300 Series Tough Pump. 1.085" inside diameter.



3/8" hex drive coupler. Trim to proper length to provide .050" to .080" end clearance



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