



HydroPull™ Extended Reach



Motor Gas Separator (MGS™)



HydroPull™ SC Tool (Stimulation and Cleanout)



Water Bypass AV Sub (WBS)



High Pressure Rotary Jet (JetRotor™)



Job Planning Software



Engineering Services

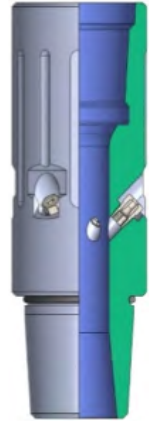


Custom Tool Development

Tempress Water Bypass Sub (WBS)

The WBS has two to six ports that bypass fluid to the annulus of the BHA. This allows pumping flow rates that are higher than the allowable ratings for motors or other bottomhole assembly components connected below.

A proprietary analysis program for the Water Bypass Sub allows the operator to select the correct port sizes for the job. Integrated into the MGS™ and WBS Performance Software, all pertinent parameters of the job are entered, and the program allows the user to select the appropriate orifice sizes by calculating and displaying key performance characteristics. Bypass orifices have special carbide inserts for consistent performance on extended reach runs. These inserts have been proven to survive weighted fluids or abrasive additives. Available in a range of sizes from 1.69-in. to 3.50-in., **the tool is fully tunable for various applications by using the Water Bypass Sub Performance Model Software.**



Applications

- Coiled and Jointed tubing
- Sand and fill cleanout
- Scale cleanout
- Cement removal
- Acidizing
- Wellbore jetting
- Depleted well service
- Commingled flow

Feature	Benefit
Higher flow	<ul style="list-style-type: none"> • Better cleaning of large wellbores and horizontals • Multi-port design promotes wellbore jet cleaning • Better sand and cuttings transport • Most robust annular velocity tool available
Fluid compatibility	<ul style="list-style-type: none"> • Water, nitrogen, carbon dioxide, polymers, solvents, brine, surfactants, foam, acid
Severe service	<ul style="list-style-type: none"> • Acid capable and routinely run in the most severe high-temperature (570 °F/300 °C) and sour gas environments
Easy make-up	<ul style="list-style-type: none"> • Short and compact length, 3.55-in. to 6.00-in. long
Field tunable	<ul style="list-style-type: none"> • Field-changeable nozzles for specific applications
High reliability	<ul style="list-style-type: none"> • Multiday extreme-reach jobs without tripping • Over 99% downhole success rate



HydroPull™ Extended Reach



Motor Gas Separator (MGS™)



HydroPull™ SC Tool (Stimulation and Cleanout)



Water Bypass AV Sub (WBS)



High Pressure Rotary Jet (JetRotor™)



Job Planning Software



Engineering Services



Custom Tool Development

Case Histories

Because of its robust design and predictable performance, the Water Bypass Sub (WBS) is consistently the most sought after annular velocity sub available. Please contact us or visit our website for the most recent WBS Case Histories.

CONTACT INFORMATION:

Tempress Technologies Inc.

2200 Lind Avenue SW
Building A, Suite 108
Renton, WA 98057
Phone: 425.251.8120

www.tempresstech.com



Use with Motors and the HydroPull™

The Water Bypass Sub nozzles are always open, so motors will be more prone to stalling if pump flow rates are reduced. Motor stalls will still produce a noticeable pressure signal on surface. During a stall, more of the pumped fluid will discharge through the bypass nozzles.

When running a Tempress HydroPull™ tool, the Water Bypass Sub should be placed above the HydroPull. If pumping gas while running a downhole motor is necessary, use a Tempress Motor Gas Separator (MGS™).

Nozzle Configuration

Bypass nozzle size and quantity should be selected so that motor performance is maximized while avoiding motor overspeed at the maximum required pump flow rate. Use the Motor Gas Separator - Water Bypass Sub Performance model Software to select the appropriate nozzle configuration.

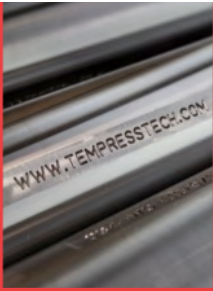
Each Water Bypass Sub requires two to six nozzles, depending on the design. It is generally best to match nozzle sizes, but specific performance can be achieved by employing other nozzle combinations.

If the pumped fluid is not screened or is not relatively free from abrasives, nozzle washout can occur, especially in extended runs.

Last Chance Screen



Clean fluid with no sand should be run to prevent nozzle washout on extended reach runs. A last chance screen is available for each tool to prevent gravel and other debris from interfering with the operation of the tool and to minimize the chance for premature failure of other bottomhole assembly components. The screen openings are available in a range of sizes depending on tool size and job requirements.



HydroPull™ Extended Reach

•
Motor Gas Separator (MGS™)

•
HydroPull™ SC Tool (Stimulation and Cleanout)

•
Water Bypass AV Sub (WBS)

•
High Pressure Rotary Jet (JetRotor™)

•
Job Planning Software

•
Engineering Services

•
Custom Tool Development

Water Bypass Sub (WBS) Operation Guide

An operation guide is included with the WBS tool that provides operating instructions and job reporting requirements. These guides are also located within our Client Login site on our website.

Motor Gas Separator (MGS™) and Water Bypass Sub (WBS) Performance Software

A proprietary software program is available for MGS and WBS tool job planning. The software evaluates the best bypass performance for the job. The software outputs circulating pressures in the well, the transport of sand and cuttings in the horizontal and vertical sections of the well, equivalent fluid flow rates, and the amount of water flow to the motor based on a set of input parameters. This software is located within our Client Login site on our website.

Two Phase Circulation Model with MGS™ & WBS Port Sizing		Enter All Blue Data		Refer to MGS™ and WBS Operation Guides for more information or call 425.221.8120 for well planning assistance	
Well Designation & data		US Units	XXXX	m-m-00-yy	
Well Data	Select Units				
	Total Vertical Depth (TVD)	3,000	ft		
	Measured Depth (MD)	20,000	ft		
	Vertical casing ID	4.67	in		
	Horizontal casing or openhole ID	4.67	in		
Work-string	Temperature gradient, deg F/1000 ft	20.0	°F/1000 ft	Bottomhole Temperature: 440 °F	
	Length of tubing (coil or jointed)	22,000	ft		
	Tubing OD	2.00	in		
	Tubing wall thickness	0.156	in		
	Tubing joint thickness	0.000	in		
Fluid/Gas	Nitrogen flow rate	3.00	scfm		
	Fluid pump flow rate	3.00	gpm		
	Wellhead choke pressure (gage)	800	psig		
	Friction reducer effect	50%	% reduction		
	Stroke concentration	0.74	ppg	Specific Gravity = 1.00	
BHA	Est. fluid tool to (-) or gained from (+) formation	0.00	gpm		
	Minimum ID in motorhead	0.668	in	upstream of gas separator	
	BHA tool diameter	2.88	in		
	Select bypass tool: MGS™ or WBS	MGS™			
	# of pressure balancing restrictors (MGS)	0		For lower flow, default 0-0. Factory installed. See HydroPull® Performance Program	
Bypass Ports	Select HydroPull tool	HydroPull®			
	HydroPull Flow Configuration	Standard Flow			
	No-load motor pressure (see Motor Data Tab)	50	psid	At fluid rate, both 0 if no motor	
	On-off bottom motor pressure differential	750	psid	See Motor Data Sheet	
	Number of nozzles per nozzle	5		Use 1 for equivalent diameter values. See Nozzle Sizes sheet	
RESULTS	Bit nozzle diameter	0.375	in		
	On Bottom (Milling) or Off Bottom	OFF BOTTOM		Standard	
	MGS™ bypass port size	0.200	inch	5.08 mm	By 1000 and
	Press P9 to recalculate until solution stabilizes			Max Port Size = 0.375	
	Total BHA pressure drop	800	psi		
Pressures	Pump pressure	4000	psi		
	Bottomhole circulating pressure (BHCP)	3470	psi		
Transport	Vertical cuttings transport ratio (1-mm sand)	77%			
	Fluid velocity in horizontal section	223	ft/min	Should be >10%	OK
	Horizontal flow stratification check	Mixed - OK			
Fluid Flow Rates	Motor equivalent flow	3.0	gpm		
	Bypass equivalent flow	0.8	gpm		
	Bypass water	0.8	gpm		
	On-off bottom motor flow variation	-	gpm	Displays when WBS selected	
Gas Separation	Ratio of water bypassed	0%			
	Water flow to motor	3.0	gpm		
	Bypass nitrogen	0.8	gpm		
	Nitrogen cut in motor	0.0	gpm		
	Nitrogen ratio in motor	0%			

