



**RADIUS  
SERVICE**

# CIRCULATING VALVE

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**PRODUCT CATALOG ver.05**

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# RADIUS-SERVICE



RADIUS-SERVICE IS A LEADING RUSSIAN OIL AND GAS EQUIPMENT MANUFACTURING COMPANY.

FOR OVER 30 YEARS RADIUS SERVICE HAS BEEN SUPPLYING CUTTING EDGE POSITIVE DISPLACEMENT MOTORS IN A VARIETY OF SIZES FOR HORIZONTAL AND DIRECTIONAL DRILLING, TOGETHER WITH OTHER DOWNHOLE EQUIPMENT LIKE JARS, DRILL STRING ELEMENTS, WHIPSTOCKS, AND OTHER PRODUCTS FOR OIL AND GAS WELL CONSTRUCTION.

SINCE 2012, IT BECAME A PART OF SCHLUMBERGER GROUP THE WORLD'S MAJOR PROVIDER OF TECHNOLOGY, INTEGRATED PROJECT MANAGEMENT AND INFORMATION SOLUTIONS TO THE OIL AND GAS INDUSTRY.



# CIRCULATING VALVE



THE CIRCULATING VALVE ENABLES PUMPING LCM AND PLUGGING MATERIALS IN AREAS OF LOST CIRCULATION, DURING ACID SPOTTING, FLUID DISPLACEMENT DURING WELL COMPLETION / WORKOVER, ETC WITHOUT ANY COSTLY TRIPPING OPERATIONS.

THE NUMBER OF ACTIVATION / DEACTIVATION CYCLES IS FIVE, IT CAN BE INCREASED AT THE CUSTOMER`S REQUEST.



- FLOW PORT
- PISTON
- SPRING
- VALVE HOUSING



# KEY BENEFITS



✓ STREAMLINED DESIGN;

✓ OPERATING TEMPERATURE UP TO 150° C;

✓ MULTIPLE DEPLOYMENTS OF ALL LCM TYPES, CEMENT GELS, THIXOTROPIC CEMENT AND ACIDS IN LOSS CIRCULATION ZONES;

✓ ACID SPOTTING INCLUDING IN WELL INTERVENTION TO ADDRESS STUCKPIPE EVENTS;

✓ NON-STOP DISPLACEMENT OF PROCESS FLUIDS DURING WELL DEVELOPMENT / COMPLETION AND WORKOVER;

✓ EFFECTIVE IN HORIZONTAL AND ERD DRILLING, IMPROVES WELL CLEANING BY INCREASING FLOW RATE.





## CIRCULATING VALVE ACTIVATION

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THE VALVE IS ACTIVATED BY A POLYMER DROP BALL.

THE BALL BLOCKS THE CENTRAL CHANNEL INCREASING THE PRESSURE, WHICH DISPLACES THE PISTON AND OPENS THE PORTS.

THE FLOW GOES THROUGH THE OPEN PORTS TO THE ANNULUS.

ONCE CIRCULATING VALVE ACTIVATED, 100% OF FLOW GOES THROUGH BYPASS PORTS AND ZERO PERCENTAGE TO BHA.

THE TOOL BYPASS PORT WILL CLOSE AS SOON AS PUMPING STOPS.



## CIRCULATING VALVE DEACTIVATION

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THE VALVE IS DEACTIVATED BY TWO METAL DROP BALLS.

THE METAL BALLS BLOCK THE PORTS INCREASING THE PRESSURE, WHICH PUSHES THE POLYMER BALL THROUGH THE CENTRAL CHANNEL.

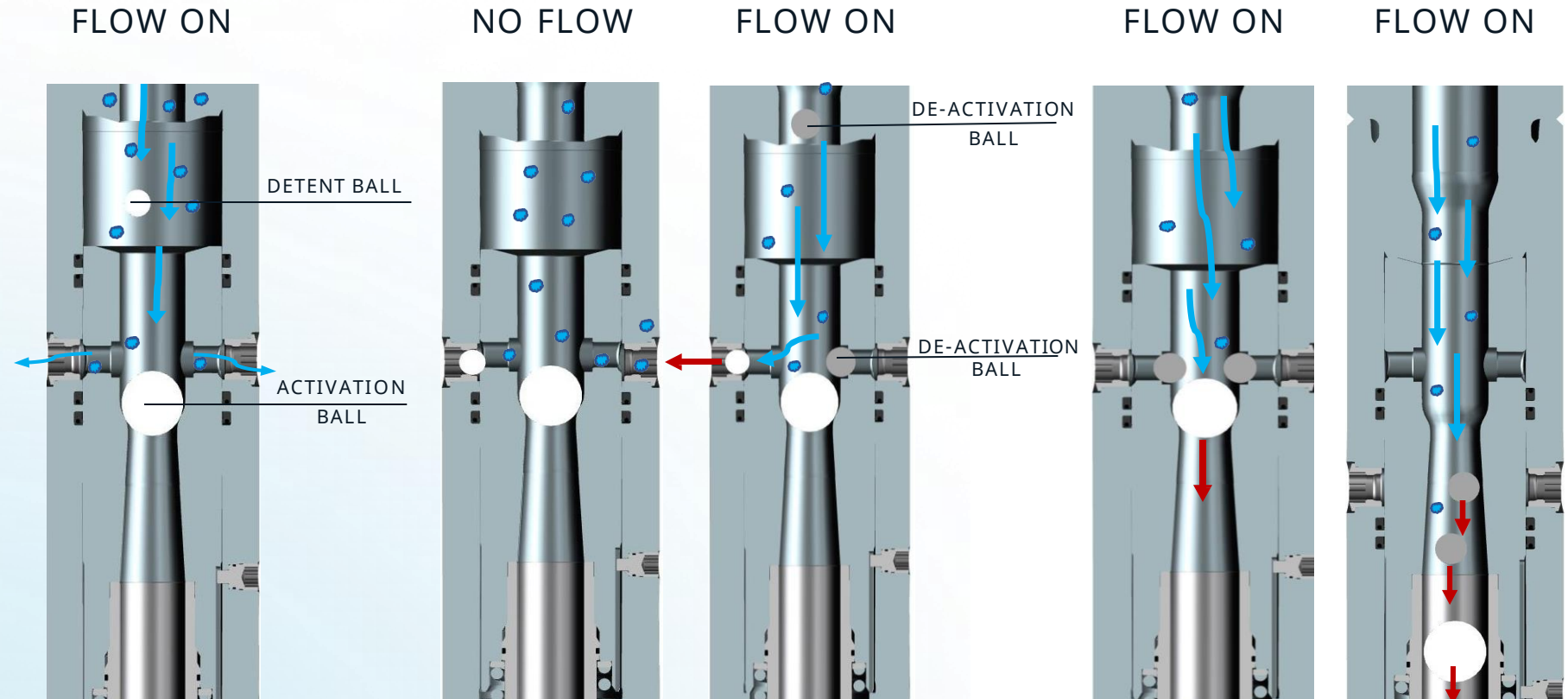
THE ACTIVATION BALL AND TWO DEACTIVATION BALLS ARE COLLECTED IN A BALL CATCHER CAGE.

THE CIRCULATING VALVE RESETS TO ITS INITIAL OPERATING MODE, THE CENTRAL CHANNEL IS OPENED AND PORTS ARE CLOSED.

# FIXED OPEN PORT FUNCTION OF CIRCULATION VALVE

FIXED OPEN PORT FEATURE ENABLES THE UNRESTRICTED FLOW OF FLUID FROM INSIDE OF THE DRILL STRING TO THE ANNULUS FROM ONE OF THE PORTS WHILE TRIPPING.

THIS FEATURE IS AVAILABLE ONLY WHEN THE DETENT POLYMER BALL IS IN ONE OF THE PORTS.



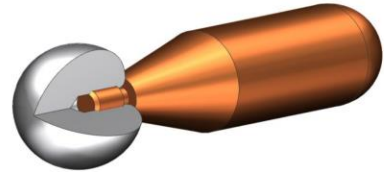
# CIRCULATION VALVE ACCESSORIES

Circulation valve		KC-106RS 4-3/16"	KC-120RS 4-3/4"	KC-172RS 6-3/4"	KC-203RS 8" KC-210RS 8-1/4" KC-220RS 8-2/3"
Activation ball	OD, mm (in)	31.3 (1.22")	47.2 (1.85")	41.7 (1.64")	62.5 (2.46")
	Weight, kg (lb)	0.022 (0.048)	0.123 (0.271)	0.05 (0.11)	0.17 (0.374)
	Material	Polymer	Polymer	Polymer	Polymer
DART for deviated and horizontal wells	OD, mm (in)	31.3 (1.22")	47.2 (1.85")	41.7 (1.64")	62.5 (2.46")
	L, mm (in)	108 (4.25")	161 (6.34")	155.5 (6.12")	160.3 (6.31")
	Weight, kg (lb)	0.03 (0.166)	0.075 (0.65)	0.068 (0.49)	1.9 (4.8)
	Material	Polymer / Bronze			
Detent ball	OD, mm (in)	-	28 (1.1")		
	Weight, kg (lb)	-	0.016 (0.035)		
	Material	-	Polymer		
Deactivation ball	OD, mm (in)	25.4 (1")	31.75 (1.25")	31.75 (1.25")	31.75 (1.25")
	Weight, kg (lb)	0.07 (0.154)	0.07 (0.154)	0.07 (0.154)	0.13 (0.286)
	Material	Steel			

ACTIVATION  
BALL



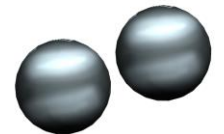
DART  
FOR DEVIATED  
AND HORIZONTAL WELLS  
(OPTIONAL)



DETENT BALL



DEACTIVATION  
BALL





## TECHNICAL SPECIFICATIONS

Technical specifications		KC-106RS	KC-120RS	KC-172RS	KC-203RS	KC-210RS	KC-220RS
Outside diameter, in		4-3/16"	4-3/4"	6-3/4"	8"	8 1/4"	8 2/3"
Min bore diameter, in		0.94	0.94	0.94	1.18		1.18
Overall length, in		68.7	72.6	85.1	73.9		75.1
Housing length, in		65.2	68.6	80.6	68.9		69.4
End connections	Down	NC31	NC38	NC50	6 5/8Reg		6 5/8 FH
	Up	NC31	NC38	NC50	6 5/8Reg		6 5/8 FH
Number of flow ports		2	2	2	2		2
Inner diameter of flow ports, in		0.78	1.06	1.06	1.06		1.06
Valve closing pressure, PSI		1 991 ± 284	1 991 ± 284	1 991 ± 284	1 991 ± 284		1 991 ± 284
Number of valve opening/closing cycles		5	5	5	5		5
Max flow rate (closed valve), gpm		285.3	396.2	713.2	1 188.70		1 188.70
Flow rate during circulation of wellbore fluids (open valve), gpm		95...238	111...238	111...317	158.5...475.5		158.5...475.7
Mud weight, lb/gal		No more 13.35	No more 13.35	No more 13.35	No more 13.35		No more 13.35
LCM pills concentration range, PPB					Upto 160		
Max particle size of LCM materials, in		0.28	0.35	0.35	0.35		0.35
Max operating temperature, °C					150		
Weight, ft		190	258	637	754	822	928