



DRILL PIPE FLOAT VALVE

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COMPANY OVERVIEW

Sigma Metals Ltd., together with its predecessor company, EMC Ltd., began manufacturing oilfield consumable parts in 1990. The following year Sigma released a complete line of drill pipe float valves (DPFV). Prior to 2003, Sigma manufactured and supplied oilfield parts exclusively under contract to major oil & gas producers under private brand labeling agreements.

Through these agreements, Sigma soon had equipment throughout the oilfields of the world. Sigma experienced major advances in manufacturing processes, quality assurance techniques, and improved product design that brought about rapid growth.

After many years of operation successfully serving the international petroleum industry, Sigma made the decision to make its field-tested, value proven equipment available through selective distribution agreements. In order to provide quick response to the industry needs, Sigma distributors maintain inventory for "off the shelf" delivery. Sigma's distributors provide local support and immediate product availability to help ensure that your operation is productive and profitable.

Sigma's field proven quality combined with its many years of manufacturing expertise underscores the confidence that the petroleum industry places in Sigma's drill pipe float valves.

PRODUCT OVERVIEW

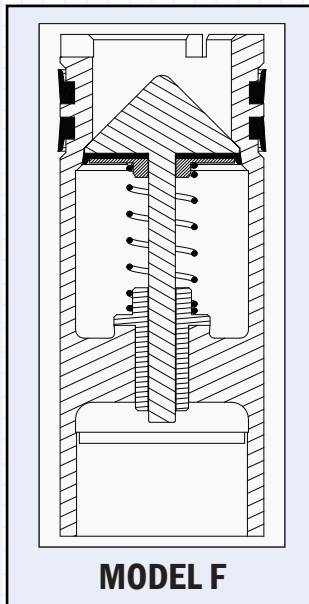
VALVE BODY: Sigma valve bodies are manufactured to exacting standards in consideration of the increasingly harsh drilling environments that are now commonplace. The Sigma valve body is manufactured with consideration to the corrosive (stress cracking) effects of hydrogen sulfide (H₂S). A controlled yield manufacturing process ensures that the Sigma valve body hardness is equal to or less than 22 Rockwell C (22 HRC). The quality control process of each production run is enhanced by independent testing that confirms that the Sigma valve body is manufactured to a tighter range of hardness than leading competitors resulting in a better performing DPFV.

ELASTOMERS: Available elastomers include Nitrile Butadine (NBR/BUNA N), Hydrogenated Nitrile Butadine (HNBR), and Viton® (Fluoroelastomer/FKM). See page 4 for more information regarding the elastomers used in Sigma Drill Pipe Float Valves and Repair Kits.

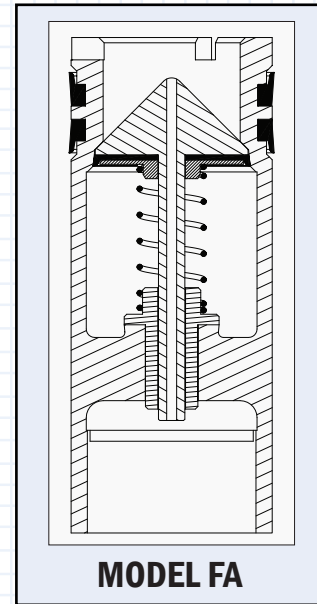
SPRINGS: Sigma's standard springs for the Model F and Model G DPFV's are manufactured using Inconel®. This high alloy steel provides superior heat resistance while also performing well in sour gas (H₂S) applications.

COATING: All metal parts, excluding springs, go through a two-step coating process. This process begins with a phosphate conversion coating followed by a second stage application of a patented (third party) fluoropolymer coating. This combination provides significant reduction in corrosion as well as increased lubricity, controlled metal-to-metal friction wear resistance for all of these metal parts.

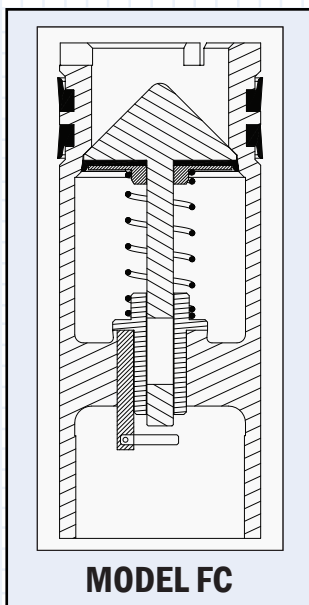
*The information contained in this catalog is intended to provide a product and usage overview. It is not intended to be used as an operational guide or as a substitute for safe drilling practices. Always refer to your Company's Engineering / Safety Departments with any questions regarding drilling and safety procedures.

DRILL PIPE FLOAT VALVES


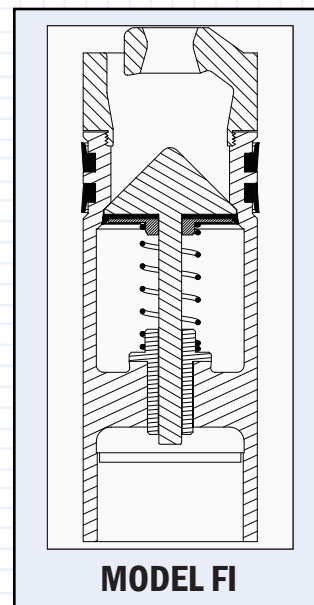
MODEL F
 Model F: The standard configuration for “Plunger” or “Piston” style DPFVs. Both cost-effective and reliable, Model F is the ideal choice for most normal drilling applications.



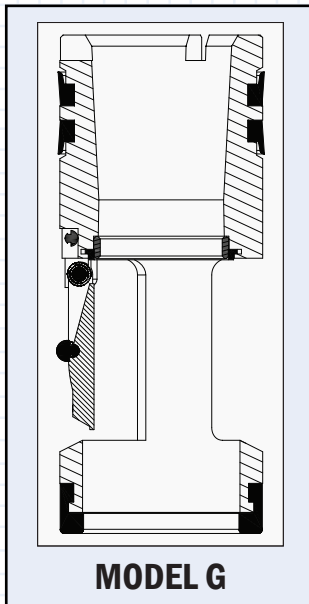
MODEL FA
 Model FA - Ported: A specialized plunger features a tungsten carbide-lined bore through its center, allowing for partial automatic filling of the drill pipe during running in. *Also available in FCA.



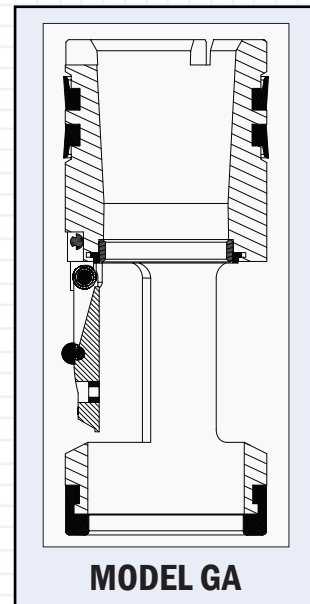
MODEL FC
 Model FC - Automatic Fill: Plunger is held in open, “automatic fill” position by self-releasing key-assembly during run-in. The drill pipe fills from the bottom, reducing run-in time and safety hazards.



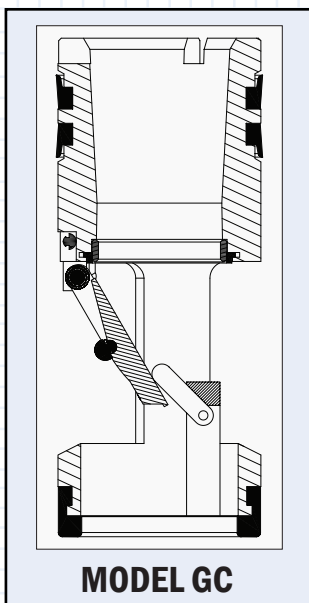
MODEL FI
 Model FI - Integrated Baffle Plate: Configuration features an integrated baffle plate for convenient and cost-effective option for applications with frequent usage of instrumentation or fluid control.

DRILL PIPE FLOAT VALVES

MODEL G

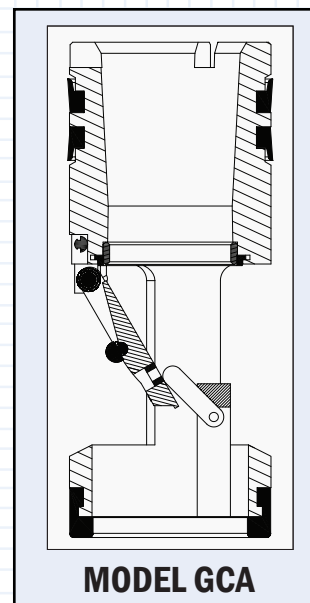
Model G: The standard configuration for “Flapper” style DPFVs. Long-lasting and versatile, Model G valves compliment primary blowout prevention equipment, and are even effective for use with highly abrasive fluids.


MODEL GA

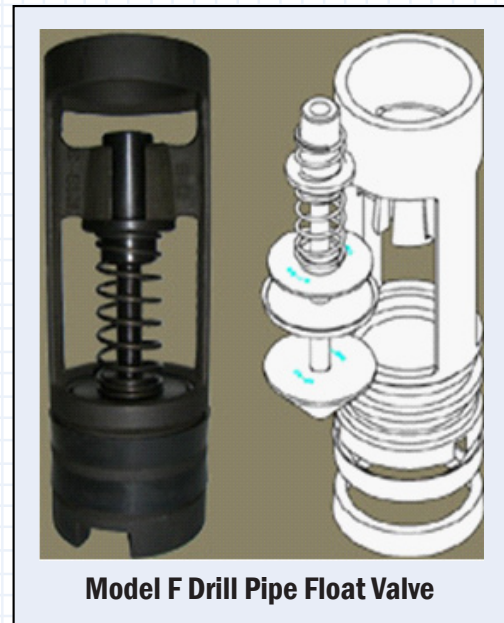
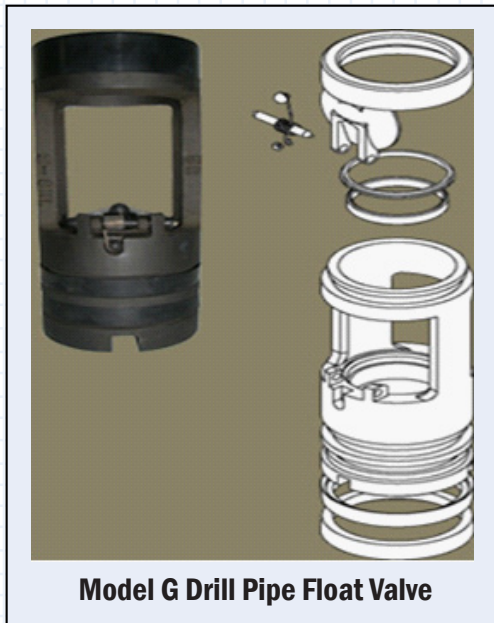
Model GA - Ported: A specialized flapper features a hollow, 1/4-inch diameter, tungsten carbide insert, allowing partial automatic filling of the drill pipe during running in. Feature also allows measurement of differential pressure.


MODEL GC

Model GC - Automatic Fill: Flapper is held in open, “automatic fill” position by self-releasing key-assembly during run-in. The drill pipe fills from the bottom, reducing run-in time and safety hazards.


MODEL GCA

Model GCA - Ported/ Automatic Fill: Configuration features automatic fill key-assembly, as well as a ported flapper. Model GCA incorporates the benefits of both Models GA and GC.

ELASTOMER SPECIFICATION INFORMATION

SEAL AND SHOCK ABSORBER ELASTOMER INFORMATION

The following is the generally accepted industry application for elastomers.

Application	Material	ASTM D2000	Temperature Range
Standard	Nitrile (BUNA, NBR)	BF, BG, BK, CH	-10° F to +212° F -23° C to +100° C
H2S	Hydrogenated Nitrile (HNBR)	DH	-22° F to +300° F -30° C to +149° C
High Temp	Fluoroelastomer DuPont Viton®	HK	-40° F to +400° F -40° C to +204° C

The seals and shock absorbers are engineered and manufactured to comply with the ASTM D2000 designation. The temperature ratings are in accordance with the ASTM D2000 designations.

American Society of Testing and Materials (ASTM) provide a standardized method of required physical properties of a rubber product, based primarily on its Type (Heat Resistance) and Class (Oil Resistance).

The most common general classification system is ASTM D 2000 Standard Classification System for rubber products. It is to aid in the selection of practical rubber products for specific environments. It also provides a line call-out designation for the specification of materials.

All drilling and production programs, including equipment selection, should be reviewed and approved by the customer's drilling and production engineering staff. Individual well conditions may call for alternate designs.

MODEL F STANDARD SERVICE (NBR)

Model F Plunger Valve				Standard Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1R	SIGMA	460111800	1.5 / (0.68)	860101800	0.5 / (0.23)	360111800	1 / (0.45)
	Baker®	480131200		016012200		015929800	
1F-2R	SIGMA	460111628	1.5 / (0.68)	860101628	0.7 / (0.32)	360111628	2 / (0.91)
	Baker®	480131422		016012300		016011300	
2F-3R	SIGMA	460112638	2.5 / (1.14)	860102638	0.8 / (0.36)	360112638	2 / (0.91)
	Baker®	480132432		016012400		016011400	
3F	SIGMA	460113600	5 / (2.27)	860103600	1 / (0.45)	360113050	2 / (0.91)
	Baker®	480133400		016012500		016011500	
3 1/2 IF	SIGMA	460113596	5 / (2.27)	860103596	1 / (0.45)	360113050	2 / (0.91)
	Baker®	480133600		016012600		016011500	
4R	SIGMA	460114800	7 / (3.18)	860104800	1 / (0.45)	360114800	2 / (0.91)
	Baker®	480134200		016012700		016011700	
4F	SIGMA	460114600	9.5 / (4.31)	860104600	1 / (0.45)	360114600	3 / (1.36)
	Baker®	480134400		016012800		016011800	
5R	SIGMA	460115800	9.5 / (4.31)	860105800	1 / (0.45)	360115800	4 / (1.81)
	Baker®	480135200		016012900		016011900	
5F-6R	SIGMA	460115668	16 / (7.26)	860105668	1.1 / (0.50)	360115668	5 / (2.27)
	Baker®	480135462		016013000		016012000	
6F	SIGMA	460116600	28 / (12.70)	860106600	2 / (0.91)	360116600	5 / (2.27)
	Baker®	480136400		016013100		016012100	

Model FA Plunger Valve - Ported				Standard Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
2F-3R	SIGMA	460122638	2.5 / (1.14)	860102638	0.8 / (0.36)	360122638	2 / (0.91)
	Baker®	480122432		016012405		016011405	
3F	SIGMA	460123600	5 / (2.27)	860103600	1 / (0.45)	360123050	2 / (0.91)
	Baker®	480123400		016012505		016011505	
3 1/2 IF	SIGMA	460123596	5 / (2.27)	860103596	1 / (0.45)	360123050	2 / (0.91)
	Baker®	480123600		016012605		016011505	
4R	SIGMA	460124800	7 / (3.18)	860104800	1 / (0.45)	360124800	2 / (0.91)
	Baker®	480124200		016012705		016011705	
5F-6R	SIGMA	460125668	16 / (7.26)	860105668	1.1 / (0.50)	360125668	5 / (2.27)
	Baker®	480125462		016013005		016012005	

MODEL F STANDARD SERVICE (NBR)

Model FC Plunger Valve - Automatic Fill				Standard Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
2F-3R	SIGMA	460152638	2.5 / (1.14)	860102638	0.8 / (0.36)	360152638	2 / (0.91)
	Baker®	480182432		016012400		070017100	
3F	SIGMA	460153600	5 / (2.27)	860103600	1 / (0.45)	360153050	2 / (0.91)
	Baker®	480183400		016012500		070017300	
3 1/2 IF	SIGMA	460153596	5 / (2.27)	860103596	1 / (0.45)	360153050	2 / (0.91)
	Baker®	480183600		016012600		070017300	
4R	SIGMA	460154800	7 / (3.18)	860104800	1 / (0.45)	360154800	2 / (0.91)
	Baker®	480184200		016012700		070017400	
4F	SIGMA	460154600	9.5 / (4.31)	860104600	1 / (0.45)	360154600	3 / (1.36)
	Baker®	480184400		016012800		070017500	
5R	SIGMA	460155800	9.5 / (4.31)	860105800	1 / (0.45)	360155800	4 / (1.81)
	Baker®	480185200		016012900		070017600	
5F-6R	SIGMA	460155668	16 / (7.26)	860105668	1.1 / (0.50)	360155668	5 / (2.27)
	Baker®	480185462		016013000		070017700	
6F	SIGMA	460156600	28 / (12.70)	860106600	2 / (0.91)	360156600	5 / (2.27)
	Baker®	480186400		016013100		070017800	

Model FI Plunger With Integral Baffle Plate				Standard Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
4R	SIGMA	460194800	9 / (4.08)	860104800	1 / (0.45)	360194800	2 / (0.91)
	Baker®	480144200		016012700		016011700	
5F-6R	SIGMA	460195668	18 / (8.16)	860105668	1.1 / (0.50)	360195668	5 / (2.27)
	Baker®	480145462		016013000		016012000	

MODEL G STANDARD SERVICE (NBR)

Model G Flapper Valve				Standard Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1F-2R	SIGMA	470131628	2 / (0.91)	870101628	0.5 / (0.23)	370131628	0.7 / (0.32)
	Baker®	480151422		051988300		051988400	
2F-3R	SIGMA	470132638	3.5 / (1.59)	870102638	0.6 / (0.27)	370132638	0.8 / (0.36)
	Baker®	480152432		016013800		016013200	
3F	SIGMA	470133600	5 / (2.27)	870103600	1 / (0.45)	370133050	1 / (0.45)
	Baker®	480153400		016013900		016013300	
3 1/2 IF	SIGMA	470133596	5 / (2.27)	870103596	1 / (0.45)	370133050	1 / (0.45)
	Baker®	480153600		051982000		052070200	
4R	SIGMA	470134800	7 / (3.18)	870104800	1.5 / (0.68)	370134800	1.1 / (0.50)
	Baker®	480154200		016014000		016013400	
4F	SIGMA	470134600	8 / (3.63)	870104600	1.6 / (0.73)	370134600	1.4 / (0.64)
	Baker®	480154400		016014100		016013500	
5R	SIGMA	470135800	9 / (4.08)	870105800	1.6 / (0.73)	370135800	1.6 / (0.73)
	Baker®	480155200		016014200		016013600	
5F-6R	SIGMA	470135668	12 / (5.44)	870105668	2 / (0.91)	370135668	1.8 / (0.82)
	Baker®	480155462		016014300		016013700	

Model GA Flapper Valve - Ported				Standard Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1F-2R	SIGMA	470141628	2 / (0.91)	870101628	0.5 / (0.23)	370141628	0.7 / (0.32)
	Baker®	480161422		051988300		052070800	
2F-3R	SIGMA	470142638	3.5 / (1.59)	870102638	0.6 / (0.27)	370142638	0.8 / (0.36)
	Baker®	480162432		016013800		017135000	
3F	SIGMA	470143600	5 / (2.27)	870103600	1 / (0.45)	370143050	1 / (0.45)
	Baker®	480163400		016013900		017136700	
3 1/2 IF	SIGMA	470143596	5 / (2.27)	870103596	1 / (0.45)	370143050	1 / (0.45)
	Baker®	480163600		051982000		052075500	
4R	SIGMA	470144800	7 / (3.18)	870104800	1.5 / (0.68)	370144800	1.1 / (0.50)
	Baker®	480164200		016014000		017116000	
4F	SIGMA	470144600	8 / (3.63)	870104600	1.6 / (0.73)	370144600	1.4 / (0.64)
	Baker®	480164400		016014100		017136800	
5R	SIGMA	470145800	9 / (4.08)	870105800	1.6 / (0.73)	370145800	1.6 / (0.73)
	Baker®	480165200		016014200		017136900	
5F-6R	SIGMA	470145668	12 / (5.44)	870105668	2 / (0.91)	370145668	1.8 / (0.82)
	Baker®	480165462		016014300		017134200	

MODEL G STANDARD SERVICE (NBR)

Model GC Flapper Valve - Automatic Fill				Standard Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
2F-3R	SIGMA Baker®	470172638 480192432	3.5 / (1.59)	870102638 016013800	0.6 / (0.27)	370172638 016013200	0.8 / (0.36)
3F	SIGMA Baker®	470173600 480193400	5 / (2.27)	870103600 016013900	1 / (0.45)	370173050 016013300	1 / (0.45)
3 1/2 IF	SIGMA Baker®	470173596 480193600	5 / (2.27)	870103596 051982000	1 / (0.45)	370173050 052070200	1 / (0.45)
4R	SIGMA Baker®	470174800 480194200	7 / (3.18)	870104800 016014000	1.5 / (0.68)	370174800 016013400	1.1 / (0.50)
4F	SIGMA Baker®	470174600 480194400	8 / (3.63)	870104600 016014100	1.6 / (0.73)	370174600 016013500	1.4 / (0.64)
5R	SIGMA Baker®	470175800 480195200	9 / (4.08)	870105800 016014200	1.6 / (0.73)	370175800 016013600	1.6 / (0.73)
5F-6R	SIGMA Baker®	470175668 480195462	12 / (5.44)	870105668 016014300	2 / (0.91)	370175668 016013700	1.8 / (0.82)

Model GCA Flapper Valve - Ported Automatic Fill				Standard Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
2F-3R	SIGMA Baker®	470182638 480192433	3.5 / (1.59)	870102638 016013800	0.6 / (0.27)	370182638 017135000	0.8 / (0.36)
3F	SIGMA Baker®	470183600 480193401	5 / (2.27)	870103600 016013900	1 / (0.45)	370183050 017136700	1 / (0.45)
3 1/2 IF	SIGMA Baker®	470183596 480193601	5 / (2.27)	870103596 051982000	1 / (0.45)	370183050 052075500	1 / (0.45)
4R	SIGMA Baker®	470184800 480194201	7 / (3.18)	870104800 016014000	1.5 / (0.68)	370184800 017116000	1.1 / (0.50)
4F	SIGMA Baker®	470184600 480194401	8 / (3.63)	870104600 016014100	1.6 / (0.73)	370184600 017136800	1.4 / (0.64)
5R	SIGMA Baker®	470185800 480195201	9 / (4.08)	870105800 016014200	1.6 / (0.73)	370185800 017136900	1.6 / (0.73)
5F-6R	SIGMA Baker®	470185668 480195463	12 / (5.44)	870105668 016014300	2 / (0.91)	370185668 017134200	1.8 / (0.82)

MODEL F SOUR GAS H₂S SERVICE (HNBR)

Model F Plunger Valve				H₂S Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1R	SIGMA	460211800	1.5 / (0.68)	860201800	0.5 / (0.23)	360211800	1 / (0.45)
	Baker®	480301200		071081701		071084901	
1F-2R	SIGMA	460211628	1.5 / (0.68)	860201628	0.7 / (0.32)	360211628	2 / (0.91)
	Baker®	480301422		071081801		071085001	
2F-3R	SIGMA	460212638	2.5 / (1.14)	860202638	0.8 / (0.36)	360212638	2 / (0.91)
	Baker®	480302432		071081901		071085101	
3F	SIGMA	460213600	5 / (2.27)	860203600	1 / (0.45)	360213050	2 / (0.91)
	Baker®	480303400		071082001		071085201	
3 1/2 IF	SIGMA	460213596	5 / (2.27)	860203596	1 / (0.45)	360213050	2 / (0.91)
	Baker®	480303600		071082101		071085301	
4R	SIGMA	460214800	7 / (3.18)	860204800	1 / (0.45)	360214800	2 / (0.91)
	Baker®	480304200		071082201		071085401	
4F	SIGMA	460214600	9.5 / (4.31)	860204600	1 / (0.45)	360214600	3 / (1.36)
	Baker®	480304400		071082301		071085501	
5R	SIGMA	460215800	9.5 / (4.31)	860205800	1 / (0.45)	360215800	4 / (1.81)
	Baker®	480305200		071082401		071085601	
5F-6R	SIGMA	460215668	16 / (7.26)	860205668	1.1 / (0.50)	360215668	5 / (2.27)
	Baker®	480305462		071082501		071085701	
6F	SIGMA	460216600	28 / (12.70)	860206600	2 / (0.91)	360216600	5 / (2.27)
	Baker®	480306400		071082601		071085801	

Model FA Plunger Valve - Ported				H₂S Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
2F-3R	SIGMA	460222638	2.5 / (1.14)	860202638	0.8 / (0.36)	360222638	2 / (0.91)
	Baker®	480352432		071081905		071085105	
3F	SIGMA	460223600	5 / (2.27)	860203600	1 / (0.45)	360223050	2 / (0.91)
	Baker®	480353400		071082005		071085205	
3 1/2 IF	SIGMA	460223596	5 / (2.27)	860203596	1 / (0.45)	360223050	2 / (0.91)
	Baker®	480353600		071082105		071085305	
4R	SIGMA	460224800	7 / (3.18)	860204800	1 / (0.45)	360224800	2 / (0.91)
	Baker®	480354200		071082205		071085405	
5F-6R	SIGMA	460225668	16 / (7.26)	860205668	1.1 / (0.50)	360225668	5 / (2.27)
	Baker®	480355462		071082505		071085705	

MODEL G SOUR GAS H₂S SERVICE (HNBR)

Model G Flapper Valve				H₂S Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1F-2R	SIGMA	470231628	2 / (0.91)	870201628	0.5 / (0.23)	370231628	0.7 / (0.32)
	Baker®	480311422		051997200		051997300	
2F-3R	SIGMA	470232638	3.5 / (1.59)	870202638	0.6 / (0.27)	370232638	0.8 / (0.36)
	Baker®	480312432		071082701		071085901	
3F	SIGMA	470233600	5 / (2.27)	870203600	1 / (0.45)	370233050	1 / (0.45)
	Baker®	480313400		071082801		071086001	
3 1/2 IF	SIGMA	470233596	5 / (2.27)	870203596	1 / (0.45)	370233050	2 / (0.91)
	Baker®	480313600		052125001		052125101	
4R	SIGMA	470234800	7 / (3.18)	870204800	1.5 / (0.68)	370234800	1.1 / (0.50)
	Baker®	480314200		071082901		071086101	
4F	SIGMA	470234600	8 / (3.63)	870204600	1.6 / (0.73)	370234600	1.4 / (0.64)
	Baker®	480314400		071083001		071086201	
5R	SIGMA	470235800	9 / (4.08)	870205800	1.6 / (0.73)	370235800	1.6 / (0.73)
	Baker®	480315200		071083101		071086301	
5F-6R	SIGMA	470235668	12 / (5.44)	870205668	2 / (0.91)	370235668	1.8 / (0.82)
	Baker®	480315462		071083201		071086401	

Model GA Flapper Valve - Ported				H₂S Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1F-2R	SIGMA	470241628	2.5 / (1.14)	870201628	0.8 / (0.36)	370241628	2 / (0.91)
	Baker®	480412432		072081905		071085105	
2F-3R	SIGMA	470242638	5 / (2.27)	870202638	1 / (0.45)	370242638	2 / (0.91)
	Baker®	480413400		072082005		071085205	
3F	SIGMA	470243600	5 / (2.27)	870203600	1 / (0.45)	370243050	2 / (0.91)
	Baker®	480413600		072082105		071085305	
3-1/2 IF	SIGMA	470243596	7 / (3.18)	870203596	1 / (0.45)	370143050	2 / (0.91)
	Baker®	480414200		072082205		071085405	
4R	SIGMA	470244800	16 / (7.26)	870204800	1.1 / (0.50)	370244800	5 / (2.27)
	Baker®	480415462		072082505		071085705	
4F	SIGMA	470244600	5 / (2.27)	870204600	1 / (0.45)	370244600	2 / (0.91)
	Baker®	480413600		072082105		071085305	
5R	SIGMA	470245800	7 / (3.18)	870205800	1 / (0.45)	370245800	2 / (0.91)
	Baker®	480414200		072082205		071085405	
5F-6R	SIGMA	470245668	16 / (7.26)	870205668	1.1 / (0.50)	370245668	5 / (2.27)
	Baker®	480415462		072082505		071085705	

MODEL G SOUR GAS H₂S SERVICE (HNBR)

Model GC Flapper Valve - Automatic Fill				H₂S Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
2F-3R	SIGMA Baker®	470272638	3.5 / (1.59)	870202638	0.6 / (0.27)	370272638	0.8 / (0.36)
		480332432		071082701		071085901	
3F	SIGMA Baker®	470273600	5 / (2.27)	870203600	1 / (0.45)	370273050	1 / (0.45)
		480333400		071082801		071086001	
4R	SIGMA Baker®	470274800	7 / (3.18)	870204800	1.5 / (0.68)	370274800	1.1 / (0.50)
		480334200		071082901		071086101	
4F	SIGMA Baker®	470274600	8 / (3.63)	870204600	1.6 / (0.73)	370274600	1.4 / (0.64)
		480334400		071083001		071086201	
5R	SIGMA Baker®	470275800	9 / (4.08)	870205800	1.6 / (0.73)	370275800	1.6 / (0.73)
		480335200		071083101		071086301	
5F-6R	SIGMA Baker®	470275668	12 / (5.44)	870205668	2 / (0.91)	370275668	1.8 / (0.82)
		480335462		071083201		071086401	

Model GCA Flapper Valve - Ported Automatic Fill				H₂S Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1F-2R	SIGMA Baker®	470281628	2 / (0.91)	870201628	0.5 / (0.23)	370281628	0.7 / (0.32)
		480261422		051988300		052070800	
2F-3R	SIGMA Baker®	470282638	3.5 / (1.59)	870202638	0.6 / (0.27)	370282638	0.8 / (0.36)
		480262432		016013800		017135000	
3F	SIGMA Baker®	470283600	5 / (2.27)	870203600	1 / (0.45)	370283050	1 / (0.45)
		480263400		016013900		017136700	
4R	SIGMA Baker®	470284800	7 / (3.18)	870204800	1.5 / (0.68)	370284800	1.1 / (0.50)
		480264200		016014000		017116000	
4F	SIGMA Baker®	470284600	8 / (3.63)	870204600	1.6 / (0.73)	370284600	1.4 / (0.64)
		480264400		016014100		017136800	
5R	SIGMA Baker®	470285800	9 / (4.08)	870205800	1.6 / (0.73)	370285800	1.6 / (0.73)
		480265200		016014200		017136900	
5F-6R	SIGMA Baker®	470285668	12 / (5.44)	870205668	2 / (0.91)	370285668	1.8 / (0.82)
		480265462		016014300		017134200	

MODEL F HIGH TEMPERATURE SERVICE (VITON)

Model F Plunger Valve				High Temperature Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1R	SIGMA Baker®	460311800 480361200	1.5 / (0.68)	860301800 072081703	0.5 / (0.23)	360311800 071084901	1 / (0.45)
1F-2R	SIGMA Baker®	460311628 480361422	1.5 / (0.68)	860301628 072081803	0.7 / (0.32)	360311628 071085001	2 / (0.91)
2F-3R	SIGMA Baker®	460312638 480362432	2.5 / (1.14)	860302638 072081903	0.8 / (0.36)	360312638 071085101	2 / (0.91)
3F	SIGMA Baker®	460313600 480363400	5 / (2.27)	860303600 072082003	1 / (0.45)	360313050 071085201	2 / (0.91)
3 1/2 IF	SIGMA Baker®	460313596 480363600	5 / (2.27)	860303596 072082103	1 / (0.45)	360313050 071085301	2 / (0.91)
4R	SIGMA Baker®	460314800 480364200	7 / (3.18)	860304800 072082203	1 / (0.45)	360314800 071085401	2 / (0.91)
4F	SIGMA Baker®	460314600 480364400	9.5 / (4.31)	860304600 072082303	1 / (0.45)	360314600 071085501	3 / (1.36)
5R	SIGMA Baker®	460315800 480365200	9.5 / (4.31)	860305800 072082403	1 / (0.45)	360315800 071085601	4 / (1.81)
5F-6R	SIGMA Baker®	460315668 480365462	16 / (7.26)	860305668 072082503	1.1 / (0.50)	360315668 071085701	5 / (2.27)
6F	SIGMA Baker®	460316600 480366400	28 / (12.70)	860306600 072082603	2 / (0.91)	360316600 071085801	5 / (2.27)

Model FA Plunger Valve - Ported				High Temperature Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
2F-3R	SIGMA Baker®	460322638 480412432	2.5 / (1.14)	860302638 072081905	0.8 / (0.36)	360322638 071085105	2 / (0.91)
3F	SIGMA Baker®	460323600 480413400	5 / (2.27)	860303600 072082005	1 / (0.45)	360323050 071085205	2 / (0.91)
3 1/2 IF	SIGMA Baker®	460323596 480413600	5 / (2.27)	860303596 072082105	1 / (0.45)	360323050 071085305	2 / (0.91)
4R	SIGMA Baker®	460324800 480414200	7 / (3.18)	860304800 072082205	1 / (0.45)	360324800 071085405	2 / (0.91)
5F-6R	SIGMA Baker®	460325668 480415462	16 / (7.26)	860305668 072082505	1.1 / (0.50)	360325668 071085705	5 / (2.27)

MODEL G HIGH TEMPERATURE SERVICE (VITON)

Model G Flapper Valve				High Temperature Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1F-2R	SIGMA	470331628	2 / (0.91)	870301628	0.5 / (0.23)	370331628	0.7 / (0.32)
	Baker®	480371422		051988303		051988403	
2F-3R	SIGMA	470332638	3.5 / (1.59)	870302638	0.6 / (0.27)	370332638	0.8 / (0.36)
	Baker®	480372432		01603803		016013203	
3F	SIGMA	470333600	5 / (2.27)	870303600	1 / (0.45)	370333050	1 / (0.45)
	Baker®	480373400		016013903		016013303	
3 1/2 IF	SIGMA	470333596	5 / (2.27)	870303596	1 / (0.45)	370333050	2 / (0.91)
	Baker®	480373600		051982003		052070203	
4R	SIGMA	470334800	7 / (3.18)	870304800	1.5 / (0.68)	370334800	1.1 / (0.50)
	Baker®	480374200		016014003		016013403	
4F	SIGMA	470334600	8 / (3.63)	870304600	1.6 / (0.73)	370334600	1.4 / (0.64)
	Baker®	480374400		016014103		016013503	
5R	SIGMA	470335800	9 / (4.08)	870305800	1.6 / (0.73)	370335800	1.6 / (0.73)
	Baker®	480375200		016014203		016013603	
5F-6R	SIGMA	470335668	12 / (5.44)	870305668	2 / (0.91)	370335668	1.8 / (0.82)
	Baker®	480375462		016014303		016013703	

Model GA Flapper Valve - Ported				High Temperature Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1F-2R	SIGMA	470341628	2 / (0.91)	870301628	0.5 / (0.23)	370331628	0.7 / (0.32)
	Baker®	480441422		051988303		051988403	
2F-3R	SIGMA	470342638	3.5 / (1.59)	870302638	0.6 / (0.27)	370332638	0.8 / (0.36)
	Baker®	480442432		01603803		016013203	
3F	SIGMA	470334600	5 / (2.27)	870303600	1 / (0.45)	370333050	1 / (0.45)
	Baker®	480443400		016013903		016013303	
3 1/2 IF	SIGMA	470343596	5 / (2.27)	870303596	1 / (0.45)	370333050	2 / (0.91)
	Baker®	480443600		051982003		052070203	
4R	SIGMA	470344800	7 / (3.18)	870304800	1.5 / (0.68)	370334800	1.1 / (0.50)
	Baker®	480444200		016014003		016013403	
4F	SIGMA	470344600	8 / (3.63)	870304600	1.6 / (0.73)	370334600	1.4 / (0.64)
	Baker®	480444400		016014103		016013503	
5R	SIGMA	470345800	9 / (4.08)	870305800	1.6 / (0.73)	370335800	1.6 / (0.73)
	Baker®	480445200		016014203		016013603	
5F-6R	SIGMA	470345668	12 / (5.44)	870305668	2 / (0.91)	370335668	1.8 / (0.82)
	Baker®	480445462		016014303		016013703	

MODEL G HIGH TEMPERATURE SERVICE (VITON)

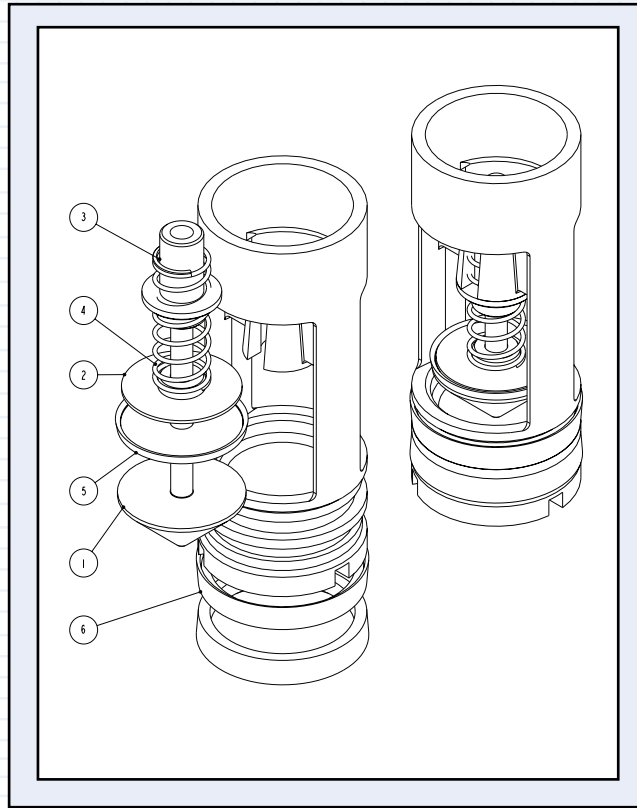
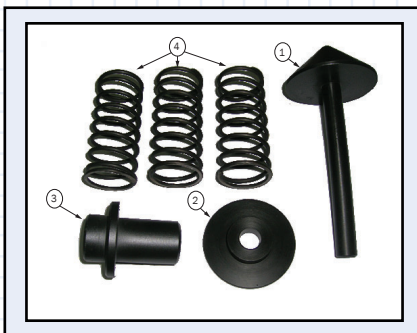
Model GC Flapper Valve - Automatic Fill				High Temperature Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
2F-3R	SIGMA Baker®	470372638	3.5 / (1.59)	870332638	0.6 / (0.27)	370372638	0.8 / (0.36)
		480192432		016013800		016013200	
3F	SIGMA Baker®	470373600	5 / (2.27)	870303600	1 / (0.45)	370373050	1 / (0.45)
		480193400		016013900		016013300	
4R	SIGMA Baker®	470374800	7 / (3.18)	870304800	1.5 / (0.68)	370374800	1.1 / (0.50)
		480194200		016014000		016013400	
4F	SIGMA Baker®	470374600	8 / (3.63)	870304600	1.6 / (0.73)	370374600	1.4 / (0.64)
		481944400		016014100		016013500	
5R	SIGMA Baker®	470375800	9 / (4.08)	870305800	1.6 / (0.73)	370375800	1.6 / (0.73)
		480195200		016014200		016013600	
5F-6R	SIGMA	470375668	12 / (5.44)	870305668	2 / (0.91)	370375668	1.8 / (0.82)
		480195462		016014300		016013700	

Model GCA Flapper Valve - Ported Automatic Fill				High Temperature Service			
Model	Mfg.	ASSEMBLY		RUBBER REPAIR KIT		METAL REPAIR KIT	
		Part Number	lbs/(kg)	Part Number	lbs/(kg)	Part Number	lbs/(kg)
1F-2R	SIGMA Baker®	470381628	2 / (0.91)	870301628	0.5 / (0.23)	370381628	0.7 / (0.32)
		480191423		051988300		052070800	
2F-3R	SIGMA Baker®	470382638	3.5 / (1.59)	870302638	0.6 / (0.27)	370382638	0.8 / (0.36)
		480192433		016013800		017135000	
3F	SIGMA Baker®	470383600	5 / (2.27)	870303600	1 / (0.45)	370383050	1 / (0.45)
		480193401		016013900		017136700	
4R	SIGMA Baker®	470384800	7 / (3.18)	870304800	1.5 / (0.68)	370384800	1.1 / (0.50)
		480194201		016014000		017116000	
4F	SIGMA Baker®	470384600	8 / (3.63)	870304600	1.6 / (0.73)	370384600	1.4 / (0.64)
		480194401		016014100		017136800	
5R	SIGMA Baker®	470385800	9 / (4.08)	870305800	1.6 / (0.73)	370385800	1.6 / (0.73)
		480195201		016014200		017136900	
5F-6R	SIGMA	470385668	12 / (5.44)	870305668	2 / (0.91)	370385668	1.8 / (0.82)
		480195463		01601430		017134200	

VALVE PULLERS FOR MODEL F AND MODEL G DRILL PIPE FLOAT VALVES

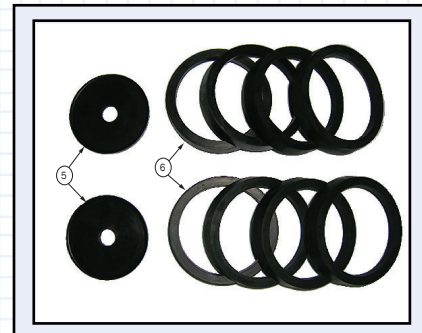
Sigma provides drill pipe float valve (DPFV) pullers. These pullers are designed to remove drill pipe float valves including Model F piston valve styles and Model G flapper valve styles

Pricing and availability upon request.

REPAIR KITS FOR ALL STYLE/TEMPERATURES OF MODEL F DRILL PIPE FLOAT VALES

Model F Metal Repair Kit (MRK)


MRK capable of 3 re-dressings

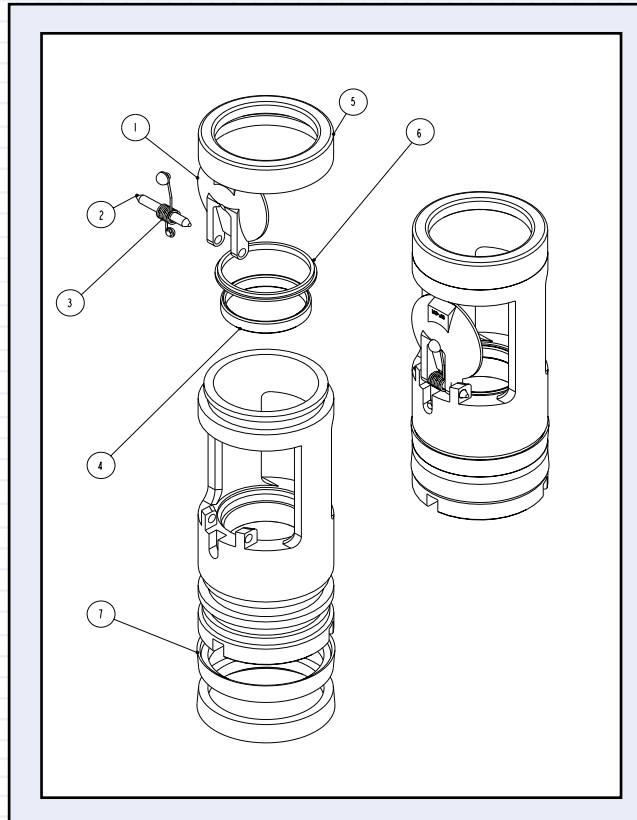
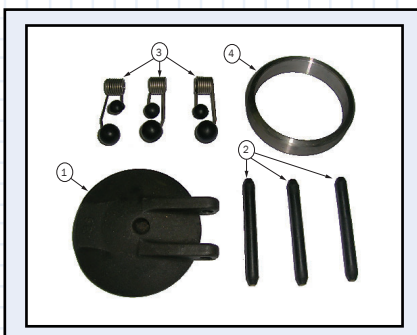
- (Item #) Item - Qty. in Kit
 (#1) Plunger Valve - 1 pc.
 (#2) Valve Seal Disk - 1 pc.
 (#3) Valve Guide - 1 pc.
 (#4) Valve Springs - 3 pcs.

Model F Rubber Repair Kit (RRK)


RRK capable of 4 re-dressings

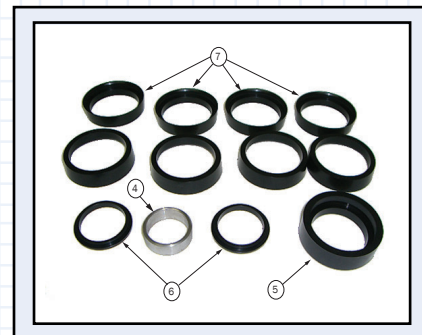
- (Item #) Item - Qty. in Kit
 (#5) Valve Seals - 2 pcs.
 (#6) Side Seals - 8 pcs.

Sigma recommends that only genuine Sigma OEM parts be used when repairing a Sigma Drill Pipe Float Valve. Sigma's product warranty does not extend to parts not manufactured by Sigma. We further recommend that proper testing be performed after all rebuilds. Each rebuilt valve should be tested to insure that the fit and functionality is correct and that it will operate as required.

REPAIR KITS FOR ALL STYLE/TEMPERATURES OF MODEL G DRILL PIPE FLOAT VALES

Model G Metal Repair Kit (MRK)


MRK capable of 3 re-dressings

- (Item #) Item - Qty. in Kit
 (#1) Flapper Valve - 1 pc.
 (#2) Hinge Pins - 3 pcs.
 (#3) Spring/Bumper Assemblies - 3 pcs.
 (#4) Seal Retaining Ring - 1 pc.

Model G Rubber Repair Kit (RRK)


RRK capable of 4 re-dressings

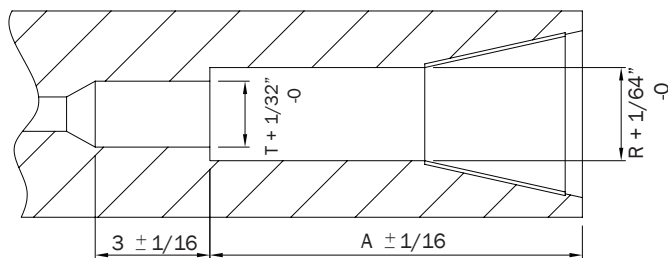
- (Item #) Item - Qty. in Kit
 (#4) Seal Retaining Ring - 1 pc.
 (#5) Shock Absorber - 1 pc.
 (#6) Valve Seals - 2 pcs.
 (#7) Side Seals - 8 pcs.

Sigma recommends that only genuine Sigma OEM parts be used when repairing a Sigma Drill Pipe Float Valve. Sigma's product warranty does not extend to parts not manufactured by Sigma. We further recommend that proper testing be performed after all rebuilds. Each rebuilt valve should be tested to insure that the fit and functionality is correct and that it will operate as required.

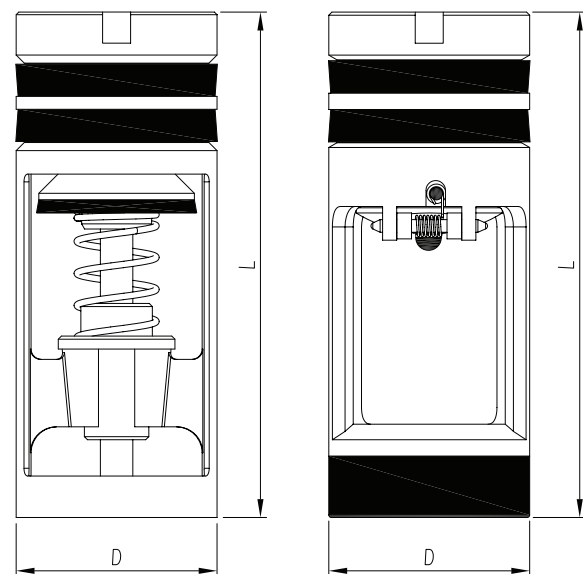
MODEL F AND G DRILL PIPE FLOAT VALVES MEASUREMENT INFORMATION

Valve Size	(D) Valve Diameter	(R) Valve Recess Diameter (D + 1/32)	(L) Valve Length	(T)* Baffle Plate Recess Diameter	Model F Valve I.D.	Model G Valve I.D.
1R	1 21/32	1 11/16	5 7/8	1 5/16	1	N/A
1F-2R	1 29/32	1 15/16	6 1/4	1 1/2	1 1/4	1
2F-3R	2 13/32	2 7/16	6 1/2	1 29/32	1 9/16	1 1/4
3F	2 13/16	2 27/32	10	2 7/16	1 7/8	1 5/8
3 1/2 IF	3 1/8	3 5/32	10	2 11/16	1 7/8	1 5/8
4R	3 15/32	3 1/2	8 5/16	2 15/16	2 5/16	1 31/32
4F	3 21/32	3 11/16	12	3 1/4	2 1/2	2 3/16
5R	3 7/8	3 29/32	9 3/4	3 3/8	2 3/4	2 1/4
5F-6R	4 25/32	4 13/16	11 3/4	4 9/32	3 1/4	2 7/8
6F	5 11/16	5 23/32	14 5/8	5 3/16	4 1/8	N/A

*If diameter "T" is equal to or less than the standard tool joint I.D. then disregard diameter "T"



A = L (Length of Drill Pipe Float Valve)
+ Length of Tool Joint + 1/4"



Model F

Model G

TOOL JOINT SPECIFICATION GUIDE

TOOL JOINT TYPES	Model Sizes (shown in inches)									
	1R	1F-2R	2F-3R	3F	3 1/2 IF	4R	4F	5R	5F-6R	6F
API Regular	2-3/8	2-7/8	3-1/2			4-1/2		5-1/2 5-9/16+	6-5/8 7-5/8^	8-5/8
Hughes or Reed Acme Regular	2-3/8	2-7/8	3-1/2			4-1/2		5-1/2 5-9/16	6-5/8	
Union Tool	2-3/8	2-7/8 3-1/2					4-1/2	5-1/2 5-9/16+	6-5/8^	
Hughes or Reed Double Streamline		2-7/8 2-3/8	3-1/2	4 4-1/2			5	5-1/2 5-9/16+		
API Full Hole		2-3/8	2-7/8	3-1/2	4	4-1/2	4-1/2+			6-5/8+
Reed Acme Full Hole				3-1/2+			4-1/2+		5-1/2 5-9/16+	
Hughes Acme Streamline		2-3/8	2-7/8	3-1/2+			4-1/2+		5-1/2 5-9/16+	
Hughes Xtra Hole			2-7/8	3-1/2			4-1/2	5	5-1/2 5-9/16+	
Reed Semi-Internal Flush			2-7/8	3-1/2			4-1/2	5		
API Internal Flush		2 3/8	2-7/8		3-1/2		4	4 1/2		
Hydril Type "IF" (Int. Flush Ext. Upset)		2 3/8+	2-7/8+	3-1/2+				4 1/2+	5	
Hydril "EIU" (Ext. Int. Upset)				3-1/2		4	4-1/2		5-1/2 5-9/16+	6-5/8
Hydril Type "F" (External Flush)	2-7/8 3-1/2+			4-1/2 5		5-1/2 5-9/16		6-5/8		
Hughes Ext. Flush Acme Type		3-1/2	4-1/2			5-1/2 5-9/16		6-5/8		
Hughes Ext. Flush Full Hole Type				4-1/2						

+ The 1D of this Float Subs are smaller than Standard tool joints.

^ Interchangeable

BIT AND SHANK SIZES (shown in inches)

BIT AND SHANK SIZES																							
Bit Size	3-1/4	3-3/8	4-1/2	4-3/4	5-1/2	6	6-1/8	6-1/4	6-1/2	6-3/4	7-7/8	8-1/4	8-1/2	8-3/4	9-1/2	9-3/4	10-1/2	11	12-1/4	13-1/2	20	24	25
Std. API Pin Shank Size	2-3/8	2-3/8	2-3/8	2-7/8	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	4-1/2	4-1/2	4 1/2	4-1/2	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	7-5/8	7-5/8	7-5/8

BIT SUB INFORMATION

API Regular Threads - Box or Pin			
Valve	Threads-in.	STD/OD-in.	Length-in
1R	2-3/8	3-1/8	18
1F-2R	2-7/8	3-3/4	20
2F-3R	3-1/2	4-1/4	
4R	4-1/2	5-1/2	24
5R	5- 1/2	6-3/4	28
5F-6R	6-5/8	7-3/4	30
5F-6R	7-5/8	8-7/8	
6F	8-5/8	10	

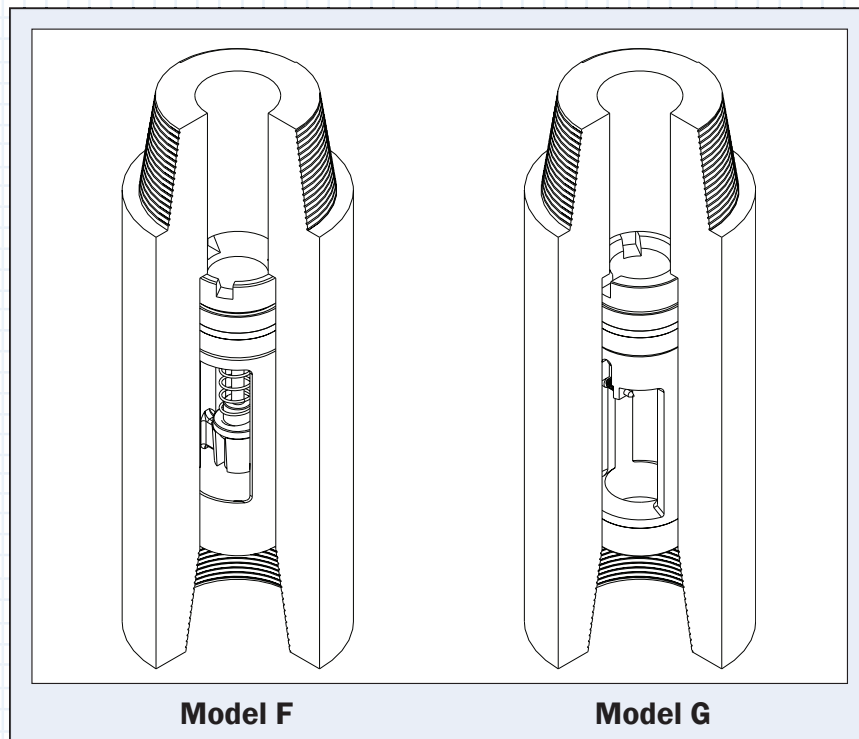
API Full Hole-Box or Pin			
Valve	Threads-in.	STD/OD-in.	Length-in
3F	3-1/2	4-5/8	24
3-1/2 IF	4	5-1/4	
4F	4-1/2	5-3/4	28
5F-6R	5-1/2	7	30
6F	6-5/8	8	

API IF			
Valve	Threads-in.	STD/OD-in.	Length-in
1F-2R	2-3/8	3-3/8	18

API IF Box-Box or Pin			
Valve	Threads-in.	STD/OD-in.	Length-in
2F-3R	2-7/8	4-1/8	20

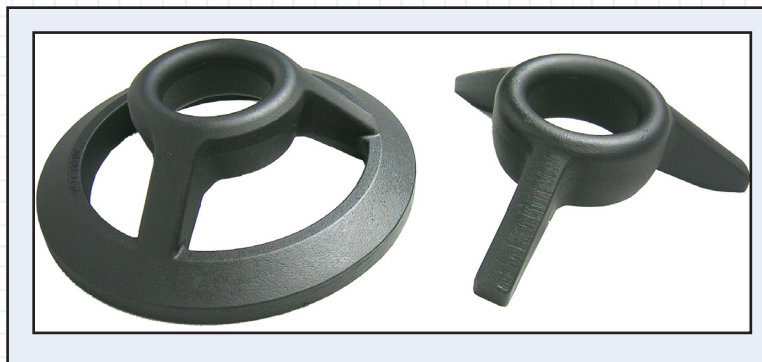
API IF			
Valve	Threads-in.	STD/OD-in.	Length-in
3-1/2 IF	3-1/2	4-3/4	24
4F	4	5-3/4	28
5R	4-1/2	6-3/8	
5F-6R	5-1/2	7-3/8	30
6F	6-5/8	8-3/4	

These specifications are for reference purposes only and are not intended to be a guideline for the manufacturing of bit subs. Please consult the specific API procedures or other manufacturing data.

BIT SUBS


ORDERING INFORMATION (MATERIAL NUMBERS AND WEIGHTS)
BAFFLE PLATES

Item	Part Number	Description	DPFV Size	Type	Weight lbs / kg
1	SMT090801	2-7/8" API Regular Tool Joint	1F2R	Spider	0.5 / (0.227)
2	SMT090802	3-1/2" API Regular	2F-3R	Ring	0.4 / (0.182)
3	SMT090803	4-1/2" API Regular	4R	Ring	0.8 / (0.364)
4	SMT090804	5-9/16" API Regular	5R	Ring	1.3 / (0.59)
5	SMT090805	6-5/8" API Regular	5F-6R	Ring	1.5 / (0.682)
6	SMT090806	7-5/8" API Regular	5F-6R	Ring	1.7 / (0.772)
7	SMT090807	8-5/8" API Regular	6F	Ring	2.2 / (1.0)
8	SMT090811	3-1/2" API Full Hole	3F	Spider	0.6 / (0.272)
9	SMT090812	4-1/2" API Full Hole	4F	Ring	0.9 / (0.409)
10	SMT090813	5-9/16" API Full Hole	5F-6R	Ring	1.5 / (0.682)
11	SMT090814	6-5/8" API Full Hole	6F	Ring	2.2 / (1.0)
12	SMT090821	3-1/2" API Full Hole	3F	Spider	0.6 / (0.272)
13	SMT090822	4-1/2" API Full Hole	4F	Spider	0.7 / (0.318)
14		4-1/2" API Regular	4R	Spider	0.7 / (0.318)
15*	SMT090826*	5-9/16" API Regular*	5R*	Spider*	0.7 / (0.318)*
16	SMT090823	5-9/16" API Full Hole	5F-6R	Spider	1 / (0.454)
17		6-5/8" API Regular	5F-6R	Spider	1 / (0.454)
18	SMT090824	6-5/8" API Full Hole	6F	Spider	1 / (0.454)
19	SMT090825	3-1/2" API Internal Flush	3-1/2 IF	Spider	0.6 / (0.272)
20	SMT090840	2-7/8" API Internal Flush	2F-3R	Ring	0.7 / (0.318)
21	SMT090841	3-1/2" API Internal Flush	3-1/2 IF	Ring	0.7 / (0.318)
22	SMT090842	4-1/2" API Internal Flush	5R	Ring	1.3 / (0.59)
23	SMT090843	2-7/8" API Internal Flush	2F-3R	Spider	0.7 / (0.318)
24	SMT090844	4" API Internal Flush	4F	Ring	1 / (0.454)



1. Acceptance of Orders All orders are subject to acceptance by Sigma Metals, Ltd. and any orders so accepted are subject to the Term and Conditions stated herein and any other written terms agreed to by Sigma Metals, Ltd. in writing between us under which your order is placed, or if no such agreement or written contract exist, all acceptances of orders and sales are conditioned upon Buyer's assent to the following terms and conditions. In the event this document is construed as an offer to sell, then acceptance of such offer is limited to the following terms and conditions and Buyer is hereby notified of Sigma Metals, Ltd.'s objection to any terms and conditions additional to or different from the following. The terms and conditions, if any, on the face here are incorporated herein by reference and made a part hereof as forth herein in their entirety.

2. Prices and Quotations All prices, whether shown in the Price List or in order acknowledgements, or otherwise, quoted upon, are in U.S. dollars and are subject to change without notice at any time prior to actual shipment of goods. Price increases will not, however, be applied to (a) goods covered by an order acknowledgment stipulating a shipment date within thirty (30) days after the effective date of the increase, or (b) charges on goods sold under a 90-day firm order accepted by Sigma Metals, Ltd. prior to the effective date of the increase. Written quotations automatically expire, unless accepted, within thirty (30) days from the date quoted and are subject to termination by notice within that period. Verbal quotations expire, unless accepted the same day they are made. The quoted price does not include any federal, state or local property, license, privilege, sales, service, use, excise, value added, gross receipts, or other like taxes which may now or hereafter be applicable with respect to this transaction, the property, its purchase, sale, replacement, value, or use, or any other services performed in connection therewith. Buyer agrees to pay or reimburse Sigma Metals, Ltd., its subcontractors or suppliers any such taxes which Sigma Metals, Ltd., its subcontractors or suppliers are required to pay or collect or which are required to be withheld by Buyer. The price shall also be subject to adjustment in accordance with the published price. Adjustment clauses, which price adjustment information shall supersede the terms of this Section 4, where inconsistent herewith. Prices shown in published literature are maintained as general sources of information and are not quotations or offers to sell. Sigma Metals, Ltd. reserves the right to make corrections due to typographical, or engineering errors, or because of incomplete or inaccurate information from Buyer.

3. Penalty Clause No penalty clause of any description, in any specification of order, with the exception of Section 6 and 16, will be effective unless specifically approved in writing by a principal officer of Sigma Metals, Ltd.

4. Cancellation An order once placed with and accepted by Sigma Metals, Ltd. can be canceled only with Sigma Metals, Ltd.'s consent and upon terms that indemnify Sigma Metals, Ltd. against loss.

5. Taxes IN THE ABSENCE OF PROPER EVIDENCE OF EXEMPTION SUPPLIED TO Sigma Metals, Ltd., if any sales, use or similar tax is payable in connection with any transactions or part thereof, between Buyer and Sigma Metals, Ltd. with respect to the goods delivered, Buyer will, upon demand of Sigma Metals, Ltd. pay to the amount of any such tax.

6. Terms of Payment All products are Net Thirty (30) Days from date of invoice. Past due accounts are subject to a service charge. In the absence of any specific designation of a payment or in the event of a failure by Buyer to make timely payment under this or any other contract with Sigma Metals, Ltd., Sigma Metals, Ltd. may, at its election, apply any payments by Buyer to Buyer's various accounts in such proportion as Sigma Metals, Ltd. shall deem appropriate. If delivery is delayed by Buyer, payment shall become due on the date Sigma Metals, Ltd. is prepared to make delivery. All installment deliveries shall be separately invoiced, and paid for without regard to subsequent deliveries. Delays in delivery or nonconformity's in any installment shall not relieve Buyer of its obligation to accept and pay for remaining installments. Buyer shall comply with Sigma Metals, Ltd.'s credit terms set forth in Section 16 and 17 thereof, and as announced by Sigma Metals, Ltd. from time to time.

7. Contract Our contract, in regard to the goods identified on the face hereon, consists in its entirety of the terms and conditions appearing in the Distribution Agreement and on the face and back of the instrument, excluding all usage's of the trade and all terms and conditions of your order which are in conflict with, or which are in addition to, the terms and conditions appearing hereon. Each delivery is a separate contract. No charges in or additions to this contract shall be of any effect unless contained in a writing signed by the party claimed to be bound thereby and no changes or additions shall be effected by the return to you, signed or unsigned, or any hereof or other forms attached to or accompanying your order which you require us to return. Except for the written contract between us, if any, under which your order is placed, no written or oral communication from us to your predating the date hereof be deemed with respect to it. The interpretation and effect hereof shall be governed by the laws of the State of Texas, USA.

8. Returned Material: No product may be returned without the written permission and specific shipping instructions of Sigma Metals, Ltd. Special products built to Buyer specifications will not be accepted for return. Products must be securely packed so as to reach Sigma Metals, Ltd. without damage. Any cost incurred by Sigma Metals, Ltd. to put products in first class condition, either for resale or with any modifications to be made by Buyer's request for return use, will be paid by Buyer. Replaced products become the property of Sigma Metals, Ltd. Material accepted for return is subject to restocking charge of 15% of the billing invoice, plus all transportation charges incurred by Sigma Metals, Ltd. All such returns shall be in accordance with procedures reasonably established by Sigma Metals, Ltd., and from time to time such procedures shall be available upon request.

9. Shipping and Delivery: Delivery and shipping promises are made in good faith, shipping dates appearing on acknowledgment of orders, or given the Buyer in any other manner, are approximate. Where the Buyer delays in supplying information necessary to proceeding with the order, the date of shipment may be extended accordingly. Sigma Metals, Ltd. shall not be liable for delay in delivery due to causes beyond its reasonable control, or due to acts of God, acts of Buyer, fire, strikes, or other concentrated actions of workmen, compliance with import or export regulations, flood, epidemics, quarantine restrictions, war insurrection, or riots, civil or military authority, freight embargoes, car wrecks, delays or shortages in transaction, unusually severe weather or inability to obtain necessary labor, materials, or manufacturing facilities due to such causes, and in the event of any such delay the date of delivery shall be extended for a length of time as may be reasonably necessary to compensate for the delay. All products are carefully packed for shipment, and Sigma Metals, Ltd. will assume no responsibility for delay, breakage, loss, or damage after delivery in good order has been made to the carrier. Buyer has the responsibility to inspect shipments prior to or during unloading to identify any damage and to make appropriate notations on the delivery tickets. All claims for loss, damage, or delay must be made to the carrier by Buyer. Claims for shortages or other errors must be made in writing to Sigma Metals, Ltd. within ten (10) days after receipt of shipment. Failure to give such notice shall constitute unqualified acceptance and a waiver of all such claims by Buyer.

10. Transportation Expense: Unless otherwise stated on the face thereof, products are sold FOB Sigma Metals, Ltd.'s Texas warehouse. Any freight charges beyond FOB Sigma Metals, Ltd.'s Texas warehouse shall be for buyers account. Where the scheduled delivery of products is delayed by Buyer, Sigma Metals, Ltd. may deliver such equipment by moving it to storage for the account of and at the risk of Buyer. If Buyer requires shipment by method or routing other than the foregoing, Buyer shall pay any additional charges or other cost resulting from its requirement. Cartage, stevedoring, insurance and all other transportation, handling, delivery and similar costs shall be paid by Buyer. These terms also apply where land routes are available but water transportation is specified by Buyer. Freight allowed to point of destination specified by Buyer will be permitted only when specifically agreed on and approved in writing by a principal representative of Sigma Metals, Ltd.

11. Limited Warranty and Limitation of Remedy and Damages: Sigma Metals, Ltd. does not warrant products not manufactured by Sigma Metals, Ltd. or its affiliates. Sigma Metals, Ltd. will assist the Buyer in presentation of the Buyer's claim to the manufacturer. As to such products or parts, Buyer shall be entitled to proceed only upon the terms of that particular manufacturer's warranty. Warranty does not apply to defects in materials provided by Buyer or design stipulated by Buyer. Used products, products not manufactured by Sigma Metals, Ltd. or affiliates are sold AS IS with no representation or warranty, and ALL WARRANTIES OF QUALITY, WRITTEN, ORAL OR IMPLIED, other than may be expressly agreed to by Sigma Metals, Ltd. in writing, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS ARE HEREBY DISCLAIMED. Sigma Metals, Ltd.'s obligation with respect to such goods shall be limited. In no event shall Sigma Metals, Ltd. be liable for any other labor, transportation, installation, adjustment or other expenses which may arise in connection with such goods. This Manufacturer's limited warranty covers the goods only to the extent and purpose for which they were manufactured and provided the product has been properly stored, installed, handled and maintained by the purchaser. Any misuse or abuse of the goods voids this limited warranty. IN NO EVENT SHALL SIGMA METALS, LTD. BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES however arising whether in warranty, strict liability, contract, tort, negligence or Otherwise, including but not limited to loss of profits or revenue, loss of total or partial use of the products, facilities or services, downtime costs, or claims of Buyer for such or other damages whether on account of products furnished hereunder or delays in delivery thereof of services performed upon or with respect to such products. Sigma Metals, Ltd.'s liability on any claim whether in warranty strict liability, contract, tort, negligence or otherwise for any loss or damage arising out of, connected with, or resulting from this contract or the performance or breach thereof, or from the design, manufacture, sale, delivery, resale, repair, replacement, installation, technical direction of installation, inspection, servicing, operation or use of any product covered by or furnished under this contract shall in no case exceed the purchase price allowable to the product or part thereof which give rise to the claim. Notice of claims against Sigma Metals, Ltd. hereunder for any reason, including breach of warranty, must be made to Sigma Metals, Ltd. in writing within forty-eight (48) hours of discovery to afford Sigma Metals, Ltd. an opportunity to make a prompt investigation of surrounding facts and mitigate any damage which might ensue, should it be determined to be Sigma Metals, Ltd.'s responsibility. Failure to give such notice to Sigma Metals, Ltd. shall constitute a waiver by Buyer of any right later to assert such a claim. Any cause of action against Sigma Metals, Ltd. arising out of or relating to the contract or the performance hereof shall expire unless brought within one year of the time of accrual thereof. THE FOREGOING LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

12. Consequential Damages Sigma Metals, Ltd. shall not be liable for any consequential, contingent, special or incidental damages, claims or expenses whatsoever, which may arise as a result of the contract or otherwise.

13. Indemnification Buyer shall defend, indemnify and hold harmless Sigma Metals, Ltd. and its agents from any claims, damages or expenses, including reasonable attorney's fees, arising or alleged to arise, from (1) any asserted deficiencies or defects in the goods caused by an alteration thereof, with or without Sigma Metals, Ltd.'s consent made by Buyer, or improper handling or storage by Buyer, (2) the breach of any terms or conditions stated herein, or (3) the act or omission of Buyer, irrespective of whether such claim, damage or expense is asserted under a strict or other product liability theory or any other legal theory.

14. Curtailment of Production In the event that an order calls for repair or fabrication and Sigma Metals, Ltd.'s production is curtailed or suspended for any reason, deliveries may, at its option, be canceled or may be prorated during the period of curtailed production and thereafter resumed until delivery is made in full.

15. Credit Shipments and deliveries shall, at all times, be subject to the approval and limitations set by Sigma Metals, Ltd.'s credit department. Prior to any extension of credit, Buyer shall submit to Sigma Metals, Ltd. an application therefore in a form acceptable to Sigma Metals, Ltd. Buyer shall execute such other instruments of documentation as Sigma Metals, Ltd. shall from time to time reasonably require prior to any extensions of credit to Buyer. If buyer shall fail to make any payments in accordance with the terms and conditions thereof or of any instrument of document referred to herein, or if Sigma Metals, Ltd. at any time has any doubt as to Buyer's financial responsibility, Sigma Metals, Ltd., in addition to all other rights and remedies, but not in limitation thereof, may at its option and without notice defer shipments or deliveries hereunder, or under any other contract with Buyer, except upon receipt of satisfactory security or of cash before payment. Upon request from Sigma Metals, Ltd., Buyer agrees to execute a security agreement covering the products sold or other assets and to perform all acts which may be necessary to perfect and assure a security position of Sigma Metals, Ltd. A service charge in the amount of the maximum legally allowable will be charged on all delinquent accounts.

16. Cost of Collection Buyer shall pay all cost of collection, including but not limited to reasonable attorneys' fees, court costs and collection agency fees involved in the collection of (a) past due accounts; (b) amounts owed to Sigma Metals, Ltd. by Buyer by reason of Buyer's breach of the Agreement, or any term or condition hereof, or any other agreement between Buyer and Sigma Metals, Ltd., (c) any amounts due for repair work not covered by Sigma Metals, Ltd.'s limited warranty; and (d) any and all amounts owed by Buyer to Sigma Metals, Ltd. for any other reason whatsoever.

17. General Unless otherwise expressly agreed in writing by a duly authorized representative of Sigma Metals, Ltd., these terms and conditions supersede all other communications and agreements and notwithstanding any conflicting or different terms and conditions in any order or acceptance of Buyer, all sales and shipments shall exclusively be governed by these terms and conditions. Any design, manufacturing drawings or other information or material submitted to the Buyer and not intended for dissemination by Buyer remain the exclusive property of Sigma Metals, Ltd. and may not, without its consent, be copied or communicated to a third party. This contract is not assignable or transferable voluntarily or by operation of law. The date hereon shall be prima facie evidence of the date on which this instrument was mailed or transmitted for delivery. The provisions of any contract resulting from this order are for the benefit of the parties hereto and not for any other reason. No waiver, alteration, or modification of any of the provision hereof shall be binding unless in writing and signed by a duly authorized representative of Sigma Metals, Ltd. If any term of condition is found to be unenforceable by a court of competent jurisdiction, said court may sever such term or condition from this contract and the remaining terms and conditions shall be enforced by said court.

18. Remedies The remedies expressly provided for in these conditions shall be in addition to any other remedies which Sigma Metals, Ltd. may have under the Uniform Commercial code or other applicable law.



xtex.com.au | sales@xtex.com.au
1-300-00-XTEX (9839)
80 DALY STREET ASCOT WA 6104

sales@xtex.com.au