UG SERIES

UTILITY GAS FILTERS AND FILTER-SEPARATORS

TYPICAL APPLICATIONS:

- GAS-FIRED ENGINES
- FIRED HEATERS
- CATALYTIC HEATERS
- INSTRUMENT GAS SYSTEMS
- PILOTS FOR FLARES

KingTool COMPANY

DESIGNED FOR EFFICIENCY...ENGINEERED FOR PERFORMANCE.

KING TOOL UGD FILTERS

Our Model UGD Series filters were developed as a highly efficient unit for use in the removal of solid particles from a wide range of gases. They utilize a molded depth-type fiberglass filter element, easily replaceable through a full opening closure, to collect particles of dust, dirt, slag, millscale, rust, and countless other solid particles in the one-micron and larger range.

The filter case is designed to accept the gas stream into its filter compartment so that no direct impingement is made on the filter media. Gas is distributed over the entire outside surface of the element and passes through the high density fiberglass element and into the outlet chamber. The controlled density of the fiberglass removes solid particles in the range of 5 microns and above on its outer surface and traps particles in the 1- to 5-micron range as they penetrate its depths.

In its new clean condition, capacities shown in the chart can be handled with a pressure drop of less than 1 psi across the unit, and this capacity can normally be maintained through a pressure drop in excess of 10 psi before breakthrough is experienced. We recommend the filter element(s) be replaced as soon as practical after the dirt load pressure drop increases to 5 psi at which point the element is 93% expended. The dirt load pressure drop should not be allowed to increase above 10 psi prior to change out since the element is considered 100% expended at 10 psi pressure drop.

A removal efficiency of 99% plus in the 1-micron range is maintained over the full flow range of 0-to-100% because this unit does not require high velocity impingement, centrifugal force, electrostatic charge, or wetted surfaces to clean the gas.

Only the most frequently used models and capacities are shown, but these units can be designed for almost any gas-cleaning application.

The filter elements are built by King Tool Company to maintain our exacting standards.

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CAPACITY CHART FOR MODEL UGD (DRY TYPE)
KING GAS FILTERS (FLOW IN SCFH)

(See page 7 for Capacities on UGW Series)

FLOWING PRESSURE PSIA	MODEL UGD-12-1	MODEL UGD-24-1	MODEL UGD-36-1	MODEL UGD-36-2	MODEL UGD-36-3
5	3179	6358	9537	19074	28611
10	5500	11000	16500	33000	49500
15	6700	13400	20100	40200	60300
20	7800	15600	23400	46800	70200
25	8600	17200	25800	51600	77400
30	9300	18600	27900	55800	83700
35	10000	20000	30000	60000	90000
40	10750	21500	32250	64500	96750
45	11130	22260	33390	66780	100170
50	11900	23800	35700	71400	107100
55	12500	25000	37500	75000	112500
60	13000	26000	39000	78000	117000
65	13550	27100	40650	81300	121950
70	14000	28000	42000	84000	126000
75	14500	29000	43500	87000	130500
80	15000	30000	45000	90000	135000
85	15450	30900	46350	92700	139050
90	15900	31800	47700	95400	143100
95	16200	32400	48600	97200	145800
100	16600	33200	49800	99600	149400
105	17000	34000	51000	102000	153000
110	17300	34600	51900	103800	155700
115	17800	35600	53400	106800	160200
120	18150	36300	54450	108900	163350
125	18450	36900	55350	110700	166050
130	19000	38000	57000	114000	171000
135	19350	38700	58050	116100	174150
140	19750	39500	59250	118500	177750
145	19900	39800	59700	119400	179100
150	20200	40400	60600	121200	181800
160	21150	42300	63450	126900	190350
170	22048	44096	66144	132288	198432
180	22767	45534	68301	136602	204903
190	23407	46814	70221	140442	210663
200	24281	48562	72843	145686	218529

The above capacity chart gives the maximum rated flow for the UGD Series Filter. The capabilities are based on a specific gravity of 0.60 and a flowing temperature of 60°F. For gravity and temperature other than this, the capacity should be corrected by applying the factors in the table below.

Flowing Temp. °F	SPECIFIC GRAVITY								
	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
60	1.000	0.9608	0.9258	0.8944	0.8660	0.8402	0.8165	0.7947	0.7746
80	0.9813	0.9428	0.9085	0.8777	0.8498	0.8245	0.8012	0.7799	0.7601
100	0.9636	0.9258	0.8921	0.8619	0.8345	0.8096	0.7868	0.7650	0.7464

CAPACITY CHART FOR 6 5/8″ O.D. SMALL UTILITY KING GAS FILTERS (FLOW IN SCFH)

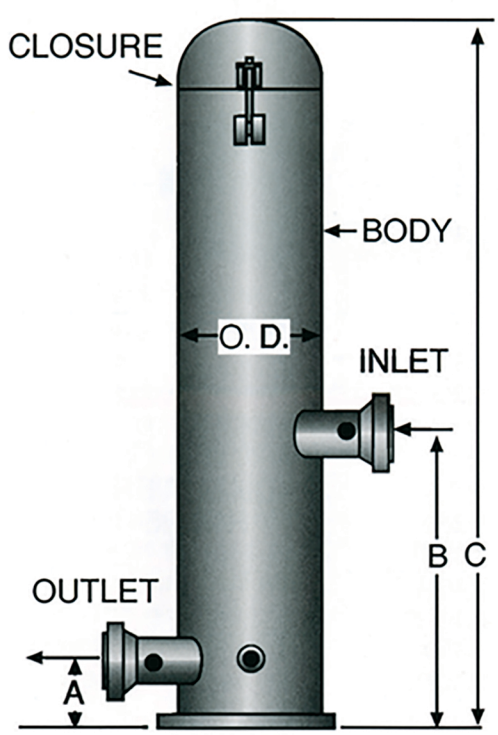
(See page 8 for Capacities on UGW Series)

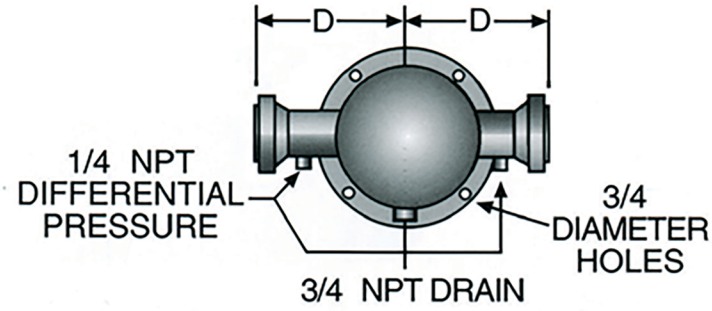
FLOWING PRESSURE PSIA	6 5/8″ O.D. MODEL UGDV 12-1	6 5/8″ O.D. MODEL UGDV-24-1	6 5/8″ O.D. MODEL UGD-36-1
5	3179	6358	9537
10	5500	11000	16500
15	6700	13400	20100
20	7800	15600	23400
25	8600	17200	25800
30	9300	18600	27900
35	10000	20000	30000
40	10750	21500	32250
45	11130	22260	33390
50	11900	23800	35700
55	12500	25000	37500
60	13000	26000	39000
65	13550	27100	40650
70	14000	28000	42000
75	14500	29000	43500
80	15000	30000	45000
85	15450	30900	46350
90	15900	31800	47700
95	16200	32400	48600
100	16600	33200	49800
105	17000	34000	51000
110	17300	34600	51900
115	17800	35600	53400
120	18150	36300	54450
125	18450	36900	55350
130	19000	38000	57000
135	19350	38700	58050
140	19750	39500	59250
145	19900	39800	59700
150	20200	40400	60600
160	21150	42300	63450
170	22048	44096	66144
180	22767	45534	68301
190	23407	46814	70221
200	24281	48562	72843
225	26098	41396	78294
250	27668	55336	83004

The above capacity chart gives the maximum rated flow for the 6 5/8′ O.G. UGD Series Filter. The capacities are based on a specific gravity of 0.60 and a flowing temperature of 60°F. For gravity and temperature other than this, the capacity should be corrected by applying the factors in the table below.

Flowing Temp. °F	SPECIFIC GRAVITY								
	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
60	1.000	0.9608	0.9258	0.8944	0.8660	0.8402	0.8165	0.7947	0.7746
80	0.9813	0.9428	0.9085	0.8777	0.8498	0.8245	0.8012	0.7799	0.7601
100	0.9636	0.9258	0.8921	0.8619	0.8345	0.8096	0.7868	0.7650	0.7464

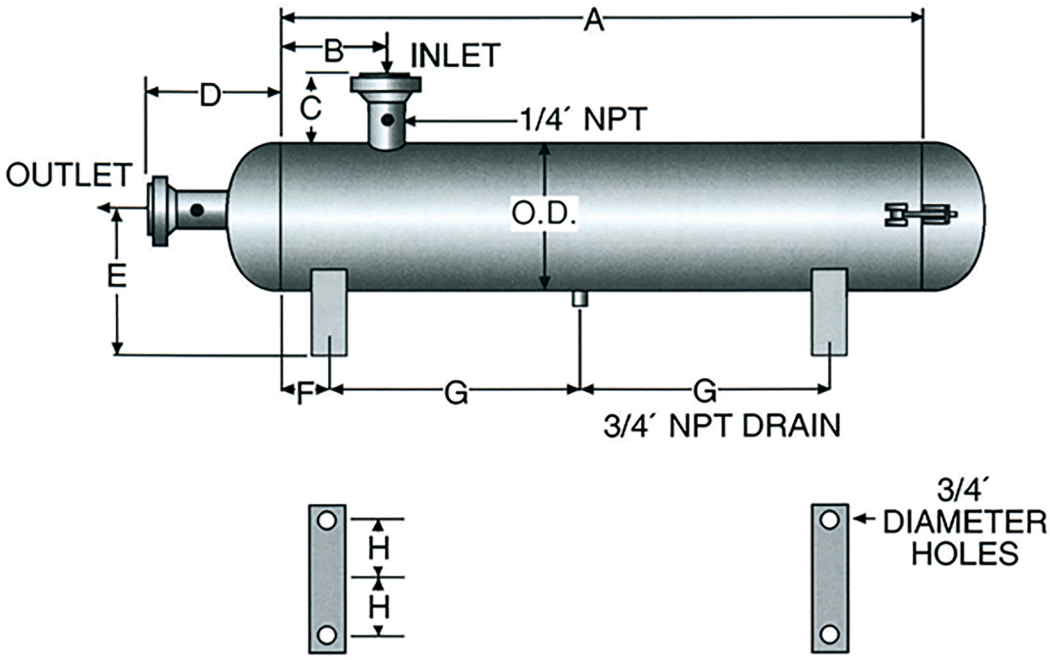
UGD VERTICAL FILTERS





DIMENSIONAL DATA FOR UGD VERTICAL FILTERS							
MODEL	O.D.	A	B	C	D	BOLT CIRCLE	NOZZLES
UGDV-12S-1	6 5/8	6	23	35 1/2	9 1/4	9 1/4	2-150-RF
UGDV-24S-1	6 5/8	6	29	47 1/2	9 1/4	9 1/4	2-150-RF
UGDV-36S-1	6 5/8″	6″	35″	59 1/2″	9 1/4″	9 1/4″	2-150-RF
UGDV-12-1	8 5/8	6	23	35 1/2	10 1/4	11	2-150-RF
UGDV-24-1	8 5/8″	6″	29″	47 1/2″	10 1/4″	11″	2-150-RF
UGDV-36-1	8 5/8	6	35	59 1/2	10 1/4	11	2-150-RF
UGDV-36-2	10 3/4	6	35	61	11 3/8	13	3-150-RF
UGDV-36-3	12 3/4	6	35	61	12 3/8	15	3-150-RF

UGD HORIZONTAL FILTERS



DIMENSIONAL DATA FOR UGD HORIZONTAL FILTERS										
MODEL	O.D.	A	B	C	D	E	F	G	H	NOZZLES
UGDH-12-1	8 5/8´	29 1/2´	9´	6´	10´	9´	4´	8 3/4´	3´	2-150-RF
UGDH-24-1	8 5/8´	41 1/2´	9´	6´	10´	9´	4´	14 3/4´	3´	2-150-RF
UGDH-36-1	8 5/8´	53 1/2´	9´	6´	10´	9´	4´	20 3/4´	3´	2-150-RF
UGDH-36-2	10 3/4´	54 1/2´	9´	6´	11´	10´	4´	21 1/4´	4´	3-150-RF
UGDH-36-3	12 3/4´	54 1/2´	9´	6´	11 1/2´	12´	4´	21 1/4´	5´	3-150-RF

KING TOOL MODEL UGW FILTER-SEPARATORS

Like our Model UGD, our Model UGW Series Filter-Separators are designed to do a highly efficient job of cleaning a wide range of gases. The UGW filter-separator, as the name implies, not only does an equally efficient filtering job, but in addition, will take out liquids entrained in the gas stream.

Gas is filtered during normal operation by flowing from the outside of the tube and passing through the element to its inside surface. Solid particles are collected on the outside surface of the replaceable element. Entrained liquid particles are allowed to flow through the tube wall where they are coalesced into droplets that form on the inner filter membrane. By sizing the unit to control the inner element velocity, these droplets will move into the gas stream. Located downstream of the coalescing element(s) is a King Tool Vane Mist Extractor designed to trap these droplets out of the gas and direct them into the liquid sump. We recommend the filter element(s) be replaced as soon as practical after the dirt load pressure drop increases to 5 psi at which point the element is 93% expended. The dirt load pressure drop should not be allowed to increase above 10 psi prior to change out since the element is considered 100% expended at 10 psi pressure drop. In the new clean condition, this unit can flow the capacities in the chart with a pressure drop of less than one psi across the unit.

A removal efficiency of 99% plus in the 1-micron range is maintained over the full flow range of 0 to 100% because this unit does not require high velocity impingement, centrifugal force, electrostatic charge or wetted surfaces to clean the gas.

Because we use the same efficient molded fiberglass in our UGW units as in our UGD units, we can guarantee a 99% plus removal of 1-micron solid and liquid particles. To assure the ultimate in solid and liquid removal in the UGW units, it is important the element(s) be changed before a pressure drop of 10 psi is experienced.

All Vane Mist Extractors and filter elements furnished are built by King Tool Company.

CAPACITY CHART FOR MODEL UGW
KING GAS FILTER-SEPARATORS (FLOW IN SCFH)

FLOWING PRESSURE PSIA	MODEL UGW-12-1	MODEL UGW-24-1	MODEL UGW-36-1	MODEL UGW-36-2	MODEL UGW-36-3	MODEL UGW-36-4	MODEL UGW-36-6
5	2230	4460	6690	12000	14600	20890	27150
10	3850	7700	11550	20710	25200	36060	46860
15	4373	8746	13120	23520	28620	40960	53240
20	5046	10093	15140	27140	33030	47280	61460
25	5736	11473	17210	30840	37530	53720	69830
30	6493	12986	19480	34910	42480	60800	79040
35	7153	14306	21460	38460	46800	66990	87080
40	7813	15626	23440	42010	51120	73170	95120
45	8433	16866	25300	45340	55170	78970	102660
50	8980	17960	26940	48280	58740	84080	109300
55	9590	19180	28770	51560	62730	89790	116720
60	10126	20253	30380	54440	66240	94810	123250
65	10620	21240	31860	57100	69480	99450	129280
70	11130	22260	33390	59840	72810	104220	135480
75	11640	23280	34920	62580	76140	108990	141680
80	12146	24293	36440	65320	79470	113750	147870
85	12616	25233	37850	67830	82530	118130	153560
90	13070	26140	39210	70270	85500	122380	159090
95	13510	27020	40530	72640	88380	126380	164290
100	13826	27653	41480	74340	90450	129470	168310
105	14240	28480	42720	76560	93150	133330	173320
110	14583	29166	43750	78410	95400	136560	177520
115	14996	29993	44990	80630	98100	140420	182540
120	15300	30600	45900	82260	100080	143250	186220
125	15640	31280	46920	84620	102960	147380	191590
130	15986	31973	47960	85960	104580	149700	194610
135	16263	32526	48790	87430	106380	152270	197950
140	16510	33020	49530	88770	108000	154590	200960
145	16853	33706	50560	90620	110250	157810	205150
150	17156	34313	51470	92240	112230	160650	208840
155	17656	35313	52970	94940	115510	165340	214920
160	17963	35926	53890	96580	117500	168190	218640
165	18343	36686	55030	98630	120000	171770	223301
170	18726	37453	56180	100680	122500	175350	227950
175	19183	38366	57550	103150	125500	179640	233530
180	19336	38673	58010	103970	126500	181070	235390
185	19613	39226	58840	105450	128300	183650	238740
190	19880	39760	59640	106890	130050	186160	242000
195	20256	40513	60770	108910	132500	189660	246550
200	20623	41246	61870	110880	134900	193100	251030

The above capacity chart gives the maximum rated flow for the UGW Series Filter-Separator. The capabilities are based on a specific gravity of 0.60 and a flowing temperature of 60°F. For gravity and temperature other than this, the capacity should be corrected by applying the factors in the table below. (Other models, although not shown, are available.)

Flowing Temp. °F	SPECIFIC GRAVITY								
	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
60	1.000	0.9608	0.9258	0.8944	0.8660	0.8402	0.8165	0.7947	0.7746
80	0.9813	0.9428	0.9085	0.8777	0.8498	0.8245	0.8012	0.7799	0.7601
100	0.9636	0.9258	0.8921	0.8619	0.8345	0.8096	0.7868	0.7650	0.7464

CAPACITY CHART FOR 6 5/8″ O.D. SMALL UTILITY KING GAS FILTER-SEPARATORS (FLOW IN SCFH)

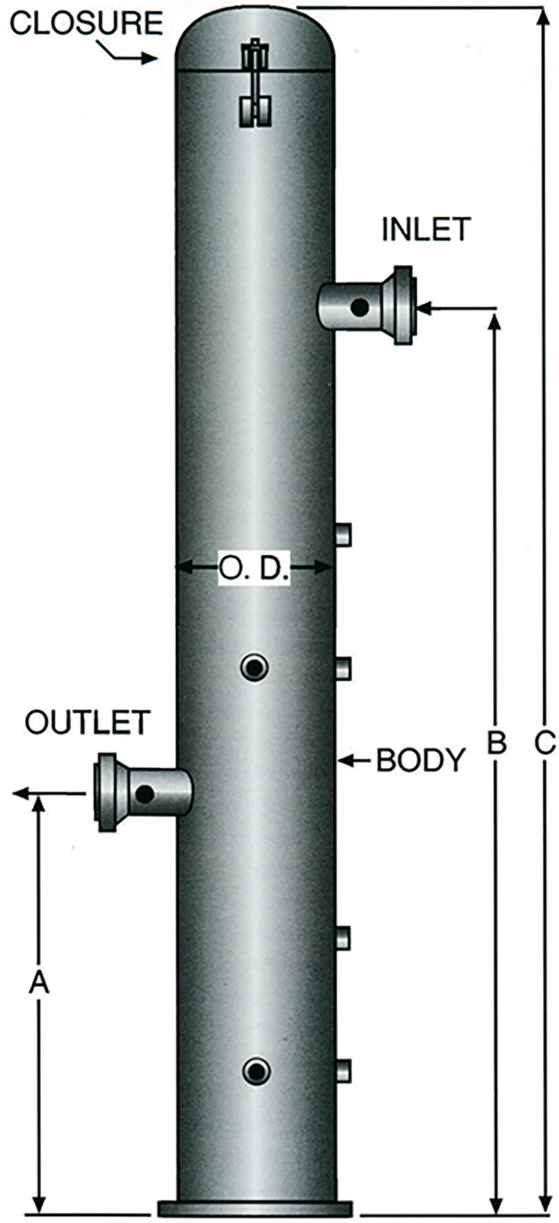
(V=Vertical; H=Horizontal)

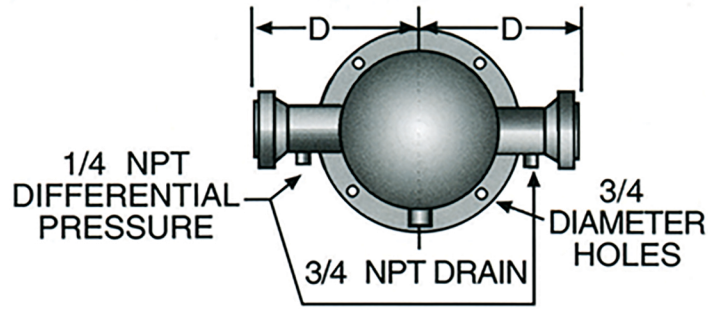
FLOWING PRESSURE PSIA	6 5/8″ O.D. MODEL UGW (V OR H) 12S-1 (SOLIDS LIMITED)	6 5/8″ O.D. MODEL UGW (V OR H) 24S-1 (SOLIDS LIMITED)	6 5/8″ O.D. MODEL UGW (V OR E) 12S-1 & 24S-1 (LIQUIDS LIMITED) 36S-1 (SOLIDS & LIQUIDS LIMITED)
5	1254	2508	3763
10	2165	4330	6496
15	2460	4920	7380
20	2838	5677	8516
25	3226	6453	9680
30	3652	7305	10958
35	4023	8047	12071
40	4395	8790	13185
45	4743	9487	14231
50	5051	10102	15153
55	5394	10788	16183
60	5696	11392	17088
65	5763	11527	17921
70	6260	12520	18781
75	6547	13094	19642
80	6832	13665	20498
85	7096	14193	21290
90	7351	14703	22055
95	7599	15198	22798
100	7777	15554	23332
105	8010	16020	24030
110	8203	16406	24609
115	8435	16870	25306
120	8606	17212	25818
125	8797	17595	26393
130	8992	17984	26977
135	9148	18296	27444
140	9286	18573	27860
145	9480	18960	28440
150	9650	19300	28951
160	10104	20208	30313
170	10533	21067	31601
180	10876	21753	32630
190	11182	22364	33547
200	11600	23200	34801
225	12468	24937	37406
250	13218	26437	39656

1. Capacities listed above are okay for 0.6 to 1.0 specific gravity hydrocarbon condensates and for water, including salt water. Gas flow based on .6 S.G. and 60°F.
2. Capacities in the third column are based on the unit's liquid mist removal capability which is identical for all three models because all three models have the same vane mist extractor.
3. Capacities in the first and second columns are limited, based on the solids removal capability. These capacities have been derated in proportion to the relative filter area in these two units (UGW-12S-1 and UGW-24S-1) compared to the filter area in the unit model UGW-36S-1.
4. Efficiency is 99.5% of all solid and liquid particles 1 micron and larger.
5. The filter element also acts to coalesce tiny liquid mist particles (under 10 micron in diameter) into droplets large enough for efficient removal by the King Vane Mist Extractor. All three filter elements (12S, 24S and 36S long) are equally efficient at coalescing.
6. All three filter elements have 3 1/2′ outside diameters and are depth type fiberglass elements.

The above capacity chart gives the maximum rated flow for the 6 5/8′ O.G. UGW Series Filter-Separator. The capacities are based on a specific gravity of 0.60 and a flowing temperature of 60°F. For gravity and temperature other than this, the capacity should be corrected by applying the factors in the table on page 7.

UGW VERTICAL FILTER-SEPARATORS

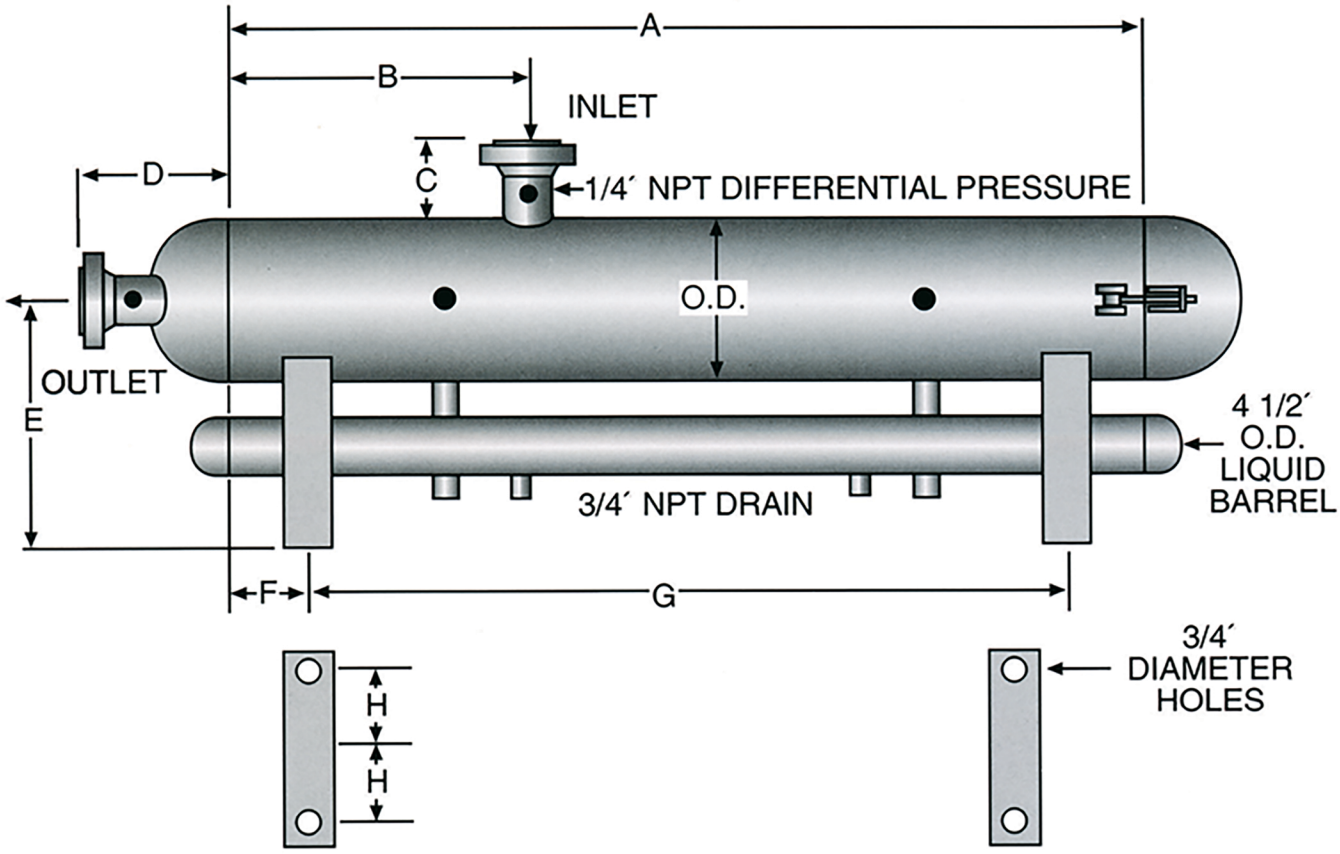




DIMENSIONAL DATA FOR UGW VERTICAL FILTER-SEPARATORS							
MODEL	O.D.	A	B	C	D	BOLT CIRCLE	NOZZLES
UGWV-12S-1	6 5/8	27	48 1/2	61	9 1/4	8 7/8	2-150-RF
UGWV-24S-1	6 5/8″	27″	54 1/2″	73″	9 1/4″	8 7/8″	2-150-RF
UGWV-36S-1	6 5/8	27	60 1/2	85	9 1/4	8 7/8	2-150-RF
UGWV-12-1	8 5/8″	27″	48 1/2″	61 1/2	10 1/4″	10 7/8″	2-150-RF
UGWV-24-1	8 5/8	27	54 1/2	73 1/2	10 1/4	10 7/8	2-150-RF
UGWV-36-1	8 5/8	27	60 1/2	85 1/2	10 1/4	10 7/8	2-150-RF
UGWV-36-2	10 3/4	30	67	90	11 3/8	13	3-150-RF
UGWV-36-3	12 3/4	33	71	94 1/2	12 3/8	15	3-150-RF
UGWV-36-4	14	36	75	101	13	16 1/4	4-150-RF
UGWV-36-6	16	39	79	105 1/2	14	18 1/4	6-150-RF

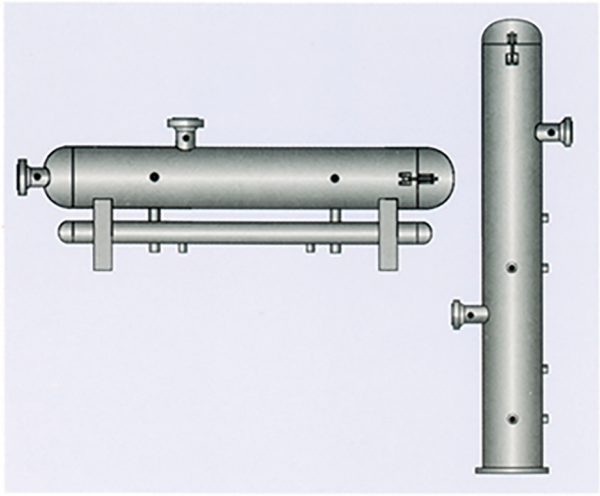
Notes: For additional dimensions for 150# ANSI units, see drawing UGWV-6/16-150.
For dimensions for 300# and 600# ANSI units, see drawing UGWV-6/16-3060.

UGW HORIZONTAL FILTER-SEPARATORS



DIMENSIONAL DATA FOR UGW HORIZONTAL FILTER-SEPARATORS										
MODEL	O.D.	A	B	C	D	E	F	G	H	NOZZLES
UGWH-12-1	8 5/8´	42´	20´	6´	10´	17´	6´	26´	4´	2-150-RF
UGWH-24-1	8 5/8´	54´	20´	6´	10´	17´	6´	38´	4´	2-150-RF
UGWH-36-1	8 5/8´	66´	20´	6´	10´	17´	6´	50´	4´	2-150-RF
UGWH-36-2	10 3/4´	68´	21´	6´	11´	18´	6´	52´	5´	3-150-RF
UGWH-36-3	12 3/4´	70´	23´	6´	11 1/2´	19´	6´	54´	6´	3-150-RF
UGWH-36-4	14´	76´	25´	6´	11 1/2´	20´	6´	58´	7´	4-150-RF
UGWH-36-6	16´	78´	28´	6´	12´	21´	6´	60´	8´	6-150-RF

Notes: For additional dimensions for 150# ANSI units, see drawing UGWH-6/16-150.
For dimensions for 300# and 600# ANSI units, see drawing UGWH-6/18-3060.



King Tool Utility Gas Filters and Filter-Separators can be used to clean up gas in a variety of applications that include:

- **GAS-FIRED ENGINES**
- **FIRED HEATERS**
- **CATALYTIC HEATERS**
- **INSTRUMENT GAS SYSTEMS**
- **PILOTS FOR FLARES**

Standard units can be built on a fast-track basis. Special units are also available, even for off-shore service.

In addition to the horizontal and vertical Utility Gas Filters and Filter-Separators described in this publication, King Tool manufactures and supplies the complete range of gas processing equipment, including:

SELF-CLEANING REVERSE FLOW MIST COALESCERS, FILTER-SEPARATORS, & DRY FILTERS

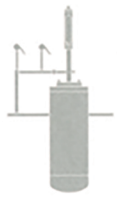
NON-SELF-CLEANING FILTERS & FILTER-SEPARATORS

HORIZONTAL & VERTICAL SEPARATORS

OIL BATH GAS SEPARATOR-SCRUBBERS

LINE SEPARATORS & FILTERS

NATURAL GAS ODORIZERS



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