

GENERAL DOWNHOLE ENVIRONMENT COMPATIBILITY

This chart offers a general guideline for the use of various elastomers in downhole oilfield applications. See the notes below the chart for some of the specific assumptions and discussion.

GENERAL DOWNHOLE ENVIRONMENT COMPATIBILITY													
DOWNHOLE - ENVIRONMENT		NOTES (SEE REFERENCE)	NATURAL RUBBER	NITRILE (A)	NITRILE (B)	HNBR (C)	HNBR (D)	NEOPRENE	EPDM (E)	VITON / FLUOREL (F) / (1)	AFLAS	HYDRIN	
		STANDARD OILFIELD SERVICE	(2)	OK / ?	OK	OK	OK	OK	OK	NR	OK	OK	OK
		SOUR SERVICE (H ₂ S)		NR	NR	NR	? (3)	OK (3)	?	OK	OK	OK	NR
		CARBON DIOXIDE (CO ₂)		NR	?	OK	?	?	?	OK	OK	OK	OK
		EXPLOSIVE DECOMPRESSION	(4)	NR	NR	OK	?	?	NR	NR	?	OK	OK
		ZINC / CALCIUM BROMIDE		NR	NR	NR	?	?	?	OK	OK	OK	---
		METHANE / NATURAL GAS		?	?	?	?	?	?	?	OK	OK	OK
		STEAM (ABOVE 300° F)		NR	NR	NR	NR	OK	NR	OK	?	OK	NR
		STRONG ACID (HCl, HF) COLD		NR	?	?	?	?	?	OK	OK	OK	?
		STRONG ACID - HOT (>200° F)		NR	NR	NR	NR	NR	NR	NR	OK	OK	NR
		WATER BASE AMINE INHIBITORS		NR	OK	OK	OK	OK	OK	OK	NR	OK	NR
		OIL BASE AMINE INHIBITORS		NR	NR	NR	NR	NR	NR	NR	NR	OK	NR
		HIGH pH FLUIDS (ALKALINE)	(5)		?	?	?	?	?	OK	NR	OK	?
	AROMATIC SOLVENTS	(6)	NR	NR	NR	NR	NR	NR	NR	OK	?	NR	
	HALOGENATED SOLVENTS	(7)	NR	NR	NR	NR	NR	NR	NR	OK	OK	NR	
	MAXIMUM TEMPERATURE LIMIT		° F	250°	275°	275°	325°	350°	250°	550°	400°	450°	275°
			° C	121°	135°	135°	163°	177°	121°	288°	204°	232°	135°

* Important notes above; for example SOUR SERVICE / HNBR shows ? (3) - you can locate this information below, as well as any other notes listed.

NOTES / DESCRIPTIONS & ABBREVIATIONS REFERENCE

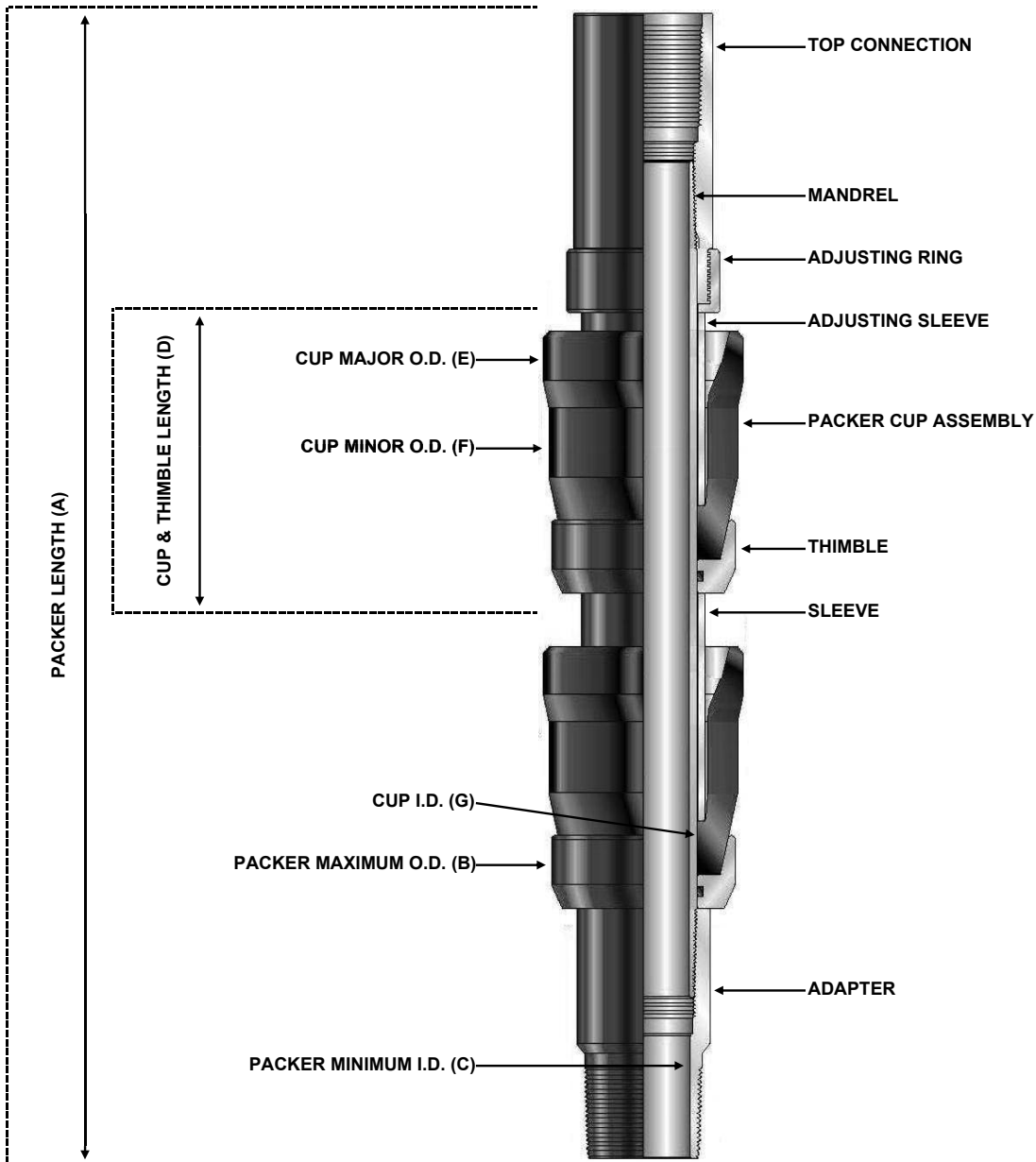
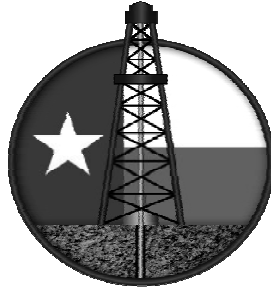
- OK** Type of Service - **Recommended**
- NR** Type of Service - **Not Recommended**
- ?** Type of Service - **Questionable / Depends on more factors**

- (A) NITRILE** - Soft/Medium (60-85 Duro)
- (B) NITRILE** - Hard (85+ Duro)
- (C) HNBR** - Sulfur Cured
- (D) HNBR** - Peroxide Cured
- (E) EPDM** - Peroxide Cured
- (F) VITON / FLUOREL** - High Fluorine Fluorel

- (1) VITON / FLOUREL** - are very similar, except in a few applications
- (2) STANDARD SERVICE** - crude oil, natural gas, brine, most drilling muds, etc...
- (3) HNBR** - can be used in H₂S up to a concentration of 10% (sulfur cured) or 15% (peroxide cured)
- (4) EXPLOSIVE DECOMPRESSION** - can be controlled using a proper bleed-off procedure
- (5) NITRILE / HNBR (HIGH pH FLUIDS)** - use of these depends on type of fluid, temperature & concentration
- (6) AROMATIC SOLVENTS** - include: Benzene, Xylene, MEK, Toluene, etc...
- (7) HALOGENATED SOLVENTS** - include: Carbon Tetrachloride, Trichloroethylene, Trichlorethane, etc...
- (8) MAXIMUM TEMPERATURE LIMIT** - listed is the temperature above which serious deterioration of the rubber is likely to occur. This is for applications having a very good "back-up" system for the rubber (such as o-rings with back-up rings, packer elements with petal plates or garter springs, etc...). Rod guides, drill pipe protectors and control line protectors seem to perform well up to 250°F (121°C) due to the specialized rubber compounding used in the products. For applications having no back-up system, such as all rubber swab cups, the practical limit is 200°F (93°C), due to softening of the rubber. Having a limited back-up system, such as wire reinforced swab cups or standard packer cups, the practical temperature limit is 225°F (107°C).

PACKER CUPS & ASSEMBLIES

GW-SS 2 CUP PACKER TECHNICAL DRAWING



GW PACKER CUP - PRODUCT LINE

The new and improved streamlined packer cup series was established over ten years ago and is now set for a global takeover. In addition to expanding, improving and streamlining the standard packer / swab cups, Texas Products WSD new "GW" series product line includes: Heavy-Duty, Extra Heavy-Duty and Hi-Temp Steam cups in all casing sizes.

Texas Products WSD is becoming one of the most reputable, sought after rubber producers in the oilfield. The new "GW" series product line is the most reliable cup the industry has to offer, while exceeding all of our competitors packer cups. In fact these cups are so reliable even our competitors have had a taste.

The question is, how do you improve on a basic product line that has been around since 1941? With a tremendous amount of oilfield knowledge and experience, along with our design capabilities that our OEM group has. First you review the problems that you have ran into in the past, then we systematically eliminate them in the new product.

The new "GW" series packer cups have an improved seal on the I.D. of the cup. In the past many users of the "historical" cups had to incorporate an o-ring on their mandrels to get them to seal. With our design improvements that have been made, this new series of cups seal on the mandrel when the assembly is tightened. This has been tested in an independant laboratory as well as in the field with outstanding results.

New rubber compounds have been developed which add to the strength of the new "GW" series. We are very proud of the temperature and pressure ratings that this new series of cups can withstand, especially the new "GW-HD" (HNBR) cups that utilize an extremely rugged HNBR rubber compound

For each casing size (4 1/2" & larger) the new "GW" series cups have been designed to function in one weight range larger or smaller than the weight range listed for the cups. This allows for use with mixed casing weights in the well and/or when casing weight is doubtful in older wells. Even though each cup will function in another weight range, this is not recommended as a normal practice due to some pressure holding limitations that may exist.

With this being the newest product line on the market today, design changes to the cups can always be made. The possiblility to make design adjustments to the new "GW" series packer cups is always there in order to reduce complication of selecting the appropriate cup for the proper application. Since there wasn't a group of rubber molds to use already, there are only two cups for any size casing. In some cases the "historical" cups were designed for certain weight ranges as "after-thoughts", while in other cases the weight ranges that are specified for the "historical" cups are not even used in todays oilfield. However, even with the improvements to the new streamlined "GW" series, all of these cups are interchangeable with the "historical" GW series produced by the Guiberson group.

NEW "GW" SERIES RATINGS					
CUP	0 - 150° F	250° F	350° F	450° F	550° F
GW-SS	4500 ^{PSI}	3250 ^{PSI}	---	---	---
GW-HD	8000 ^{PSI}	6500 ^{PSI}	---	---	---
GW-HD (HNBR)	8500 ^{PSI}	7000 ^{PSI}	5000 ^{PSI}	---	---
GW-ST	4500 ^{PSI}	4000 ^{PSI}	3250 ^{PSI}	2500 ^{PSI}	1500 ^{PSI}
GW-SP	6000 ^{PSI}	3000 ^{PSI}	---	---	---

GW-SS

The standard "GW" packer cup, molded using a very tough 80 durometer proprietary nitrile rubber compound. The "GW-SS" is reinforced by loop-formed spring steel wires. This cup is for standard, limited pressure, moderate temperature service.

GW-HD

A heavy-duty "GW" packer cup, molded using an extra strong 85 durometer proprietary nitrile rubber compound. Rather than wire reinforcing, the "GW-HD" uses a heavy-duty insert made with a double row of overlapping spring steel plates to provide the strongest reinforcement.

GW-HD (HNBR)

The extra heavy-duty "GW" packer cup uses the same heavy-duty overlapping spring steel plate reinforcement as the "GW-HD". Molded using an extremely durable 85 durometer proprietary hydrogenated nitrile rubber compound. The HNBR rubber provides better chemical resistance and a higher operating temperature than standard nitrile. The "GW-HD" (HNBR) can be used in wells with up to 15% H₂S and temperatures up to 350° F.

GW-ST

A hi-temp steam "GW" packer cup, molded using a special 85 durometer proprietary EPDM rubber compound. This compound utilizes technology developed for the "Hot Rock Geothermal Project" by the U.S. Department of Energy in New Mexico a few years back when alternate energy sources were first being sought. The "GW-ST" uses the heavy-duty overlapping spring steel plate reinforcement and the special rubber compound allows this cup to be used in water or steam up to 550° F. This cup must never be used in liquid hydrocarbons. EPDM swells dramatically in oil or grease.

GW-SP

The "GW-SP" (special packer) cup, is bacically the smae make and configuration as the "GW-SS". However, this cup contains additional I.D. seals (o-rings) and a thick cross section for added durability.

GW-SC

The "GW" swab cup also known as "GW-SC", is the cup to use when lifting the last drop from a well. In tubing sizes 2 3/8" - 4" the swab cup and the "GW-SS" cup are the same; with the same wire-loop reinforcing and the same tough nitrile rubber. In casing size cups 4 1/2" and larger) the "GW-SC" is molded from the same tough nitrile rubber as the "GW-SS", but there are no wires in the "GW-SC" casing cups.

PACKER ASSEMBLIES

A "GW" packer assemblies parts list is included in this catalog. Please reference the "PACKERS" section of this catalog.

PACKER CUPS & ASSEMBLIES

GW SERIES PACKER CUPS - DIMENSIONAL DATA

ENGINEERING DATA AND PART NUMBERS

O.D. (IN.)	WEIGHT (LB/FT)	GW-SS (NITRILE)	GWD-HD (NITRILE)	GWD-HD (HNBR)	GW-ST (EPDM)	GW-SC (NITRILE)	GW-SEAL (O-RING)	MAJOR O.D. (IN.)	MINOR O.D. (IN.)	SLEEVE O.D. (IN.)	I.D. (IN.)	INSIDE HEIGHT (IN.)
2 3/8	4.60-4.70	TP10716	---	---	---	TP10716	---	2.050	1.900	1.280	1.090	0.960
2 7/8	6.40-6.50	TP10047	---	---	TP87307	TP10047	---	2.500	2.330	1.540	1.340	1.320
3 1/8	---	TP16370	---	---	---	---	---	3.125	3.000	2.125	1.937	1.000
3 1/2	9.20-10.20	TP14960	---	---	TP87310	TP14960	---	3.050	2.830	1.530	1.340	1.330
	[LARGE I.D.]	TP16146	---	---	---	---	---	3.050	2.830	2.160	1.940	1.330
	[KOBE]	TP61943	---	---	---	---	---	3.050	2.830	2.160	1.940	1.330
	12.95-13.30	TP14082	---	---	TP87311	TP14082	---	2.840	2.510	1.530	1.340	1.330
4	9.50-11.60	TP14036	---	---	TP87312	TP14036	---	3.630	3.250	2.160	1.940	1.330
4 1/2	21.50-23.70											
4 1/2	9.50-12.60	TP30509	TP54864	TP54864-001	TP87313	TP19841	---	4.180	3.770	2.650	2.400	1.510
5	23.20-24.10											
5.5	35.30-38.00											
4 1/2	13.50-18.90	TP10430	TP54430	TP54430-001	TP87314	TP19840	---	4.020	3.510	2.640	2.400	1.510
5 1/2	40.50-43.10											
5	13.00-15.00	TP25389	TP54865	TP54865-001	TP87315	TP19843	---	4.630	4.190	2.640	2.410	1.560
5 1/2	26.80-29.70											
5	18.00-23.20	TP17831	TP54866	TP54866-001	---	TP19842	---	4.490	3.850	2.640	2.410	1.560
5 1/2	32.60-35.30											
5 1/2	13.00-17.00	TP22625	TP54753	TP54753-001	TP87318	TP19846	TP30848	5.140	4.700	3.310	2.910	1.630
	17.00-23.00	TP19711	TP54760	TP54760-001	TP87316	TP19844	TP30846	5.020	4.420	3.270	2.900	1.640
5 3/4	14.00-17.00	TP14714	TP54714	TP54714-001	TP87335	TP19847	TP30847	5.440	4.950	3.270	2.910	1.660
6	20.00											
6	15.00-18.00	TP14721	---	---	TP87336	TP19848	---	5.670	5.190	3.270	2.910	1.660
7	46.40-53.60											
6 5/8	20.00-24.00	TP19389	TP54872	TP54872-001	TP87319	TP19850	TP30851	6.240	5.650	4.020	3.530	1.560
7	32.00-35.00											
6 5/8	28.00-32.00	TP19277	TP54870	TP54870-001	TP87320	TP19849	TP30850	6.030	5.500	4.020	3.530	1.560
7	38.00-42.70											
7	17.00-20.00	TP17819	TP54819	TP54819-001	TP87322	TP19853	TP30854	6.650	6.050	4.030	3.530	1.680
7 5/8	42.80-45.30											
7	23.00-29.00	TP17462	TP54796	TP54796-001	TP87323	TP19852	TP30853	6.550	6.000	4.030	3.530	1.680
7 5/8	47.10-51.20											
7 5/8	26.40-29.70	TP19391	TP54826	TP54826-001	TP87338	TP19855	---	7.150	6.600	4.030	3.530	1.680
	33.70-39.00	TP23051	TP54825	TP54825-001	TP87339	TP19854	---	6.990	6.350	4.030	3.530	1.680
8	26.00	TP16009	TP54827	TP54827-001	TP87324	---	TP93421	7.486	7.290	4.030	3.530	1.680
	28.20	TP16110	---	TP54826-006	---	---	---	7.310	7.180	4.030	3.530	1.680
8 5/8	28.00-36.00	TP16111	---	---	TP87326	---	TP16110	8.230	7.600	5.030	4.530	1.680
	40.00-49.00	TP16115	---	---	TP87327	---	TP16114	8.040	7.300	5.030	4.530	1.680
9	40.00-45.00	TP15941	---	---	---	---	TP15942	8.380	7.700	5.030	4.530	1.680
8 5/8	24.00											
9 5/8	64.90-75.60											
9 5/8	36.00-43.50	TP10354	TP54354	TP54354-001	TP87329	---	TP14970	9.180	8.400	5.040	4.530	1.680
	47.00-53.50	TP33850	TP54850	TP54850-001	TP87330	---	TP14971	8.960	8.160	5.030	4.530	1.630
10 3/4	32.75-55.50	TP13197	TP54034	TP54034-001	TP87331	TP19034	---	10.450	9.400	5.030	4.530	1.680
	55.50-65.70	TP13198	TP54198	TP54198-001	TP87332	---	---	10.040	9.100	5.030	4.530	1.680
11 3/4	38.00-60.00	TP14246	TP54296	TP54296-001	TP87333	---	---	11.380	10.540	5.030	4.530	1.680
	60.00-65.00	TP14247	TP54297	TP54297-001	TP87335	---	---	11.060	10.350	5.030	4.530	1.680
13 3/8	48.00-72.00	TP16298	TP54298	TP54298-001	TP87334	---	---	12.980	12.200	6.030	4.530	1.750
16	65.00-109.0	TP16299	TP54299	TP54299-001	TP87336	---	---	15.530	14.310	8.270	4.530	2.500
18 5/8	87.50-94.00	TP18299	TP54189	TP54189-001	TP87337	---	---	18.070	16.380	8.270	4.530	2.500
20	78.60-135.0	TP20010	TP56200	TP56200-001	TP97355	---	---	19.560	17.520	---	4.530	2.000

* **FHD-GW:** For a Heavy Duty Fluorocarbon Cup, replace "-001" with "-003" (ex. TP54864-001 becomes TP54864-003).

** **SEAL-GW:** Has a smaller I.D. with o-ring for sealing insurance; on cups 10 3/4" & larger they do not have a smaller I.D., but if an o-ring is desired add a -007 to the base part number (ex. TP14246 becomes TP14246-007)