Subject Pump (Buckets) Cups

The seals used in brass windmill pumps and differential compensators are called either Cups or Buckets. – They are therefore, either Pump Cups or Pump Buckets, or Diff Cups or Diff Buckets. They are available in Leather, Neoprene, or Nitrile. The Pump Cups are sometimes referred to as having a “large hole”, while the Diff Cups are called “small hole”.

Leather

Nitrile

Neoprene

Which type of Cup is the best?

A good pump and differential cup should

- be on-size (exactly the same size as the pump (or differential) cylinder)
- be shaped to suit the pump Plunger (the Alderdice Pump has a scalloped seat on the Plunger Block and Spacer)
- be permeable (so water can penetrate through the material and therefore lubricate the sliding surface)
- have good friction characteristics
- have a lubricant built in.
- expand for its own wear.

It is only leather that satisfies all these requirements. Neoprene (which are actually made from nitrile) and Nitrile Cups will last longer, but they tend to cause the windmill to operate under an increased load. The Cups last longer but the windmill doesn’t.

The golden rules of Pump Cups

1. Don’t over-tighten the Plunger

2. “Crack a Leather bucket” before fitting – this involves kneading the bucket to soften the leather. This will ensure that swelling in the Cup happens quickly and up the cylinder; rather than outwards to jamb the plunger.

3. Test the pump prior to assembling the Column. This test is done on the work bench, by lifting the plunger in the pump and from the top of the stroke – let it go. The plunger should slide down under its own weight. If it doesn’t the Cups are too tight. If it free falls the Cups are too loose. The plunger should slide down steadily.

4. Get the pump pumping as quickly as possible (this encourages the swelling of the Cups up along the cylinder rather than outwards.

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Differential (Diff) Cups

Leather		Nitrile		Neoprene	
Inch	mm	Inch	mm	Inch	mm
.3/4”	19				
7/8”	22				
1”	25	1”	25	1”	25
1.1/8”	28	1.1/8”	28	1.1/8”	28
1.1/4”	32	1.1/4”	32	1.1/4”	32
1.3/8”	35	1.3/8”	35	1.3/8”	35
1.1/2”	40	1.1/2”	40	1.1/2”	40
1.3/4”	45	1.3/4”	45	1.3/4”	45
1.7/8”	48	1.7/8”	48	1.7/8”	48
2”	50			2”	50
2.1/4”	56			2.1/4”	56
2.1/2”	65			2.1/2”	65
2.3/4”	70			2.3/4”	70
3”	75			3”	75
3.1/4”	80			3.1/4”	80
3.1/2”	90			3.1/2”	90
3.3/4”	96				
4”	100			4”	100
4.1/4”	106				
4.1/2”	112				
4.3/4”	120				
5”	125				
5.1/2”	140				
6	150				

ump Cups

Inch	mm	Inch	mm	Inch	mm
1.3/4”	45				
2”	50	2”	50	2”	50
2.1/4”	56	2.1/4”	56	2.1/4”	56
2.3/8”	60				
2.1/2”	65	2.1/2”	65	2.1/2”	65
2.3/4”	70	2.3/4”	70	2.3/4”	70
3”	75	3”	75	3”	75
3.1/4”	80			3.1/4”	80
3.1/2”	90	3.1/2”	90	3.1/2”	90
3.3/4”	96				
4”	100	4”	100	4”	100
4.1/4”	106			4.1/4”	106
4.1/2”	112			4.1/2”	112
4.3/4”	120				
5”	125			5”	125
5.1/2”	140			5.1/2”	140
6	150			6	150

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