

**APPLIED SEISMIC RESEARCH CORPORATION**  
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**Items to be Provided by Operator for each Installation of an ASR “Standard” Hydro-Impact Tool (If desired all of the tool related items can be supplied by ACE Pump, shipped with the tool and billed as a separate item, in addition to the tool)**

- Wellbore suitable to operation of the tool – please check for doglegs, restrictions, etc.
- Wellbore with 7” or larger casing down to perforations
- Wellbore environment suitable to operation of the tool – We recommend Baker Petrolite chemical service to treat the water, if water problems exist – the casing should be cleaned of any wall cake or material adhered to it that could potentially drop off and enter into our tool
- Norris Type 97 pony rods: (2) 1” x 2’; (4) 1” x 4’; (6) 1” x 6’; (22) 1” x 8’; (2) 1” x 10’
- (4) joints of 4 ½” 15.50 #/ft L-80 w/PH-6 Koppel threads tubing
- Sufficient standard new tubing (3 ½” or larger) to reach prescribed setting depth of tool
- Sufficient new 1” rods or co-rod to reach prescribed setting depth of tool
- (2) Polish rod clamps for 1 ½” polish rod
- ACE Pump, Bakersfield, CA On/Off tool
- ACE Pump, Bakersfield, CA rod-guides
- 30-foot 1 ½” polish rod
- Huber-Hercules DPSB stuffing box for 1 ½” polish rod
- JP Radigan #226 shock absorber for 1 ½” polish rod
- Huber polish rod lubricator
- Packer if required; we recommend the Baker LOK-SET type packers
- Pumping tee
- Connections required for pumping tee to injection line, if installed on an injection well
- Perforated sub to be installed above the tool, same size as injection tubing.
- (12) cans Berryman Chemtool brake cleaner; (4) 250-ml bottles of Lockite Threadlock 271
- Rig with casing power tongs, slips, and power backup tongs capable of handling tubing upsets with outside diameters of up to 5.5” and 1” rods – torque for 4 ½” PH-6 tubing is 6,500 ft-lbs and 1” rods 1000 ft-lbs – see below for suggested power tong type 5 ½” Eckels with hydraulic backup with 5” wrap around fine tooth connection dies (typically 5 ½” and 4 ½” wrap around fine tooth connection dies are brought out just for the odd chance a strange situation will arise where these might be needed)
- A pumping unit capable of handling 10-ton loads over rod weight with either a 144” or 168” stroke length depending on setting depth; set at 6 strokes/minute and a 50 hp motor

All shipping costs for the tool and items provided by Ace Pump, Bakersfield, CA are paid by the Licensee