



## Engineering Bulletin – EB94-001

### RUBBER GOODS: STORAGE CONDITIONS AND SHELF LIFE LIMITS

#### Scope

This bulletin defines the requirements for the storage conditions and the maximum acceptable storage life permissible for rubber and elastomeric products. These requirements shall be applicable to all custom molded rubber and elastomeric materials used in Hydril products whether manufactured by Hydril or by Hydril's suppliers including Bettis Rubber Products.

The total storage life of rubber and elastomeric products shall be the maximum period of time from its date of manufacture when properly packaged and stored as provided by Table No. 1.

Rubber and elastomeric materials not shown in Table No. 2 of this bulletin shall meet the maximum storage life requirements of SAE ARP5316.

#### Background

The properties of most rubber and elastomeric materials change as a result of aging. The amount of property change varies with time, environmental conditions and mechanical stress. The environmental conditions include the ambient temperature, the amount of light and the oxygen or ozone to which the materials are exposed during their time in storage.

The maximum total storage life limits have been predetermined based upon the minimum acceptable storage conditions. This ensures that the properties of each elastomer will not have changed to the extent of measurably affecting the seal performance of the part(s) in which they are installed. These limits are also dependent upon the product application and the type of compound comprising the elastomeric material. Hydril's policy has been to require a minimum of two years shelf life in the user's possession. The maximum Hydril storage life and the total storage life are presented in Table No. 2 categorized by the part application and the type of elastomeric compound.

Therefore the practical shelf life limits of rubber and elastomeric products are a function of storage conditions. To minimize these changes prior to being placed in service and maximize the shelf life, Hydril requires minimum acceptable storage conditions for its elastomeric products. Hydril's requirements for storage conditions are listed in Table No. 1.

#### Storage And Shelf Life Requirements

The minimum acceptable storage conditions are shown in Table No. 1. The maximum storage shelf life limits are shown in Table No. 2. Proper packaging requires that parts shall remain in the original Hydril packaging or shall be placed in four (4) mil minimum thickness,

opaque, polyethylene plastic bags or wrapped in four (4) mil minimum thickness, opaque, polyethylene plastic wrap and sealed as far as practicable to protect the parts from light and oxygen and/or ozone in the storage environment.

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**TABLE NO. 1:  
STORAGE CONDITIONS FOR RUBBER AND ELASTOMERIC PRODUCTS**

Storage Parameter	Recommended Storage	Minimum Acceptable	Unacceptable Storage
Temperature	Less than 80°F	Less than 120°F	Greater than 120°F
Light	Complete Darkness	Indirect Light	Direct Light
Stress	Separate Packages	Sacks of Loose Parts	Pinched, Stretched, Creased
Environment	Clean Dry Air	Humid Air	Oil, Grease and/or Water
Oxygen and Ozone	Sealed Package	Open Air	Near Electric Motors/Arcs

**TABLE NO. 2:  
HYDRIL RUBBER AND ELASTOMERIC PRODUCTS STORAGE LIFE LIMITS**

Rubber and Elastomeric Components		Maximum Life Hydril Storage	Max. Total <sup>1</sup> Storage Life
<b>High Volume to Surface Area Rubber and Elastomeric Components, Including Bettis Products</b>			
Type of Component	Type of Elastomer		
Annular BOP Packing Elements	Nitrile (NBR)	4 Years	6 Years
Annular BOP Packing Elements	Natural Rubber (NR)	4 Years	6 Years
Annular BOP Packing Elements	Hydrogenated Nitrile (HSN and XHSN)	5 Years	7 Years
BOP Ram Block Elements	Nitrile (NBR and XNBR)	4 Years	6 Years
BOP Ram Block Elements	Hydrin (ECO)	4 Years	6 Years
BOP Ram Block Elements	Hydrogenated Nitrile (HSN and XHSN)	5 Years	7 Years
<b>Low Volume to Surface Area Rubber and Elastomeric Components, Including Bettis Products</b>			
Annular BOP Square Seals, Lip Seals and Headers	Nitrile (NBR)	3 Years	5 Years
Annular BOP O-Ring Cross Sections	Nitrile (NBR)	3 Years	5 Years
BOP Ram Block Top and Lateral Seals	Nitrile (NBR and XNBR)	3 Years	5 Years
BOP Ram Block Top and Lateral Seals	Hydrogenated Nitrile (HSN & XHSN)	4 Years	6 Years

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TABLE NO. 2:

HYDRIL RUBBER AND ELASTOMERIC PRODUCTS STORAGE LIFE LIMITS (Cont'd.)

Rubber and Elastomeric Components		Maximum Life Hydril Storage	Max. Total <sup>1</sup> Storage Life
Type of Component	Type of Elastomer		
Ram BOP Bonnet Seals	Nitrile (NBR and XNBR)	3 Years	5 Years
Ram BOP Bonnet Seals	Hydrogenated Nitrile (HSN & XHSN)	3 Years	6 Years
Polypack, Wipers etc.	Polyurethanes and combinations with Nitriles (NBR, HSN and U)	4 Years	6 Years
Drill Stem Valve Seals (V Packing & Molded Lip Seals)	Nitrile (NBR)	4 Years	6 Years
Pulsation Dampeners, PD and IPs,	Fluoropolymers (FKM)	8 Years	10 Years
Pulsation Dampeners, PD and IPs,	Other Elastomeric Materials	4 Years	6 Years
Pipe Protectors, Split	NBR or HSN	4 Years	6 Years
Pipe Protectors, Stretch On	Natural Rubber (NR) & Neoprene (CR)	3 Years	5 Years
Pipe Wipers	Natural Rubber (NR)	3 Years	5 Years
<b>Bettis Rubber Products</b>			
Seal Kits, Annular & Ram BOPs	Nitrile (NBR)	3 Years	5 Years
Stripper Rubbers & Red Wipers	Natural Rubber (NR) & Neoprene (CR)	3 Years	5 Years
Bladders & Diaphragms	Natural Rubber (NR)	3 Years	5 Years
Bladders & Diaphragms	Hydrogenated Nitrile (HSN)	4 Years	6 Years
Mounts & Isolators	Neoprene (CR)	3 Years	5 Years
Tong Straps, Balance Straps, Etc.	Neoprene (CR)	3 Years	5 Years
Boat Snubbers	Neoprene (CR)	4 Years	6 Years
Air Union Tubes	Nitrile (NBR)	3 Years	5 Years
Armaplate	Natural Rubber (NR)	4 Years	6 Years

**Note 1: Total Shelf Life is listed here (The maximum Hydril storage life plus 2 years). The Total Storage Life, Hydril plus End User is dependent upon storage conditions (See Table No. 1).**