Retainers for miniature ball bearings

Retainers are vital for efficient operation of ball bearings. First, they keep the balls separated and evenly spaced, ensuring a uniform distribution of load and thereby reducing heat while enhancing the bearing life expectancy.

Secondly, the retainer guides the balls in the load-free zone and prevents the balls from dropping out of separable bearings. Using our customized designs and materials, retainers can be manufactured to meet any application. We recommend usage of a two-part ribbon retainer for the majority of applications.

In this context, we would like to point out that certain lubricants cannot be used with all retainers.

See the following list for our range of different retainer variants:

GRW retainer designation	Illustration	Description/ material	Scope of application / purpose
E **J**		Two-piece retainer made from – steel sheet (E) – stainless steel sheet (J) Retainer clamping types: – without additional sign = standard – F = retainer tightly clamped – L = retainer loosely clamped	E/J: Standard retainer for deep groove radial bearings. For stainless bearings: retainer always made from stainless steel sheet. To avoid torque peaks as far as possible, this retainer can also be mounted in a loosely clamped condition. JH: For deep groove radial bearings. Used primarily for small ball bearings and low to medium speeds.
JH		One-piece snap-type retainer made of stainless steel (JH)	
J1 **XTRAflow**		Two-piece hybrid material retainer made from – stainless steel sheet (J1)	For applications which require minimal friction and long life even at poor lubrication conditions.
TNH		One-piece molded synthetic snap retainer.	For deep groove radial bearings in medium speed range with good running and torque characteristics. Working temperature from –30°C to +80 °C, short term up to +100 °C.
TNX**H**		One-piece molded synthetic snap retainer made from glass fiber reinforced plastic. X stands for a number and defines the material.	For deep groove radial bearings in a speed range above that of the TNH retainer. Working temperature from –30°C to +120 °C, short term up to +180 °C.
THA **THB**		Machined one-piece snap retainer made from fiber-reinforced phenolic resin. A = outer ring guided B = inner ring guided	For deep groove radial bearings with very high speeds. High rigidity and emergency running properties. Working temperature from -50°C to +130°C. Can be impregnated with oil.
TX**HA** **T**X**HB** **XTRAIon**		Machined one-piece snap retainer made from a special material. X stands for a number and defines the material. A = outer ring guided B = inner ring guided	For deep groove radial bearing with very high speeds. High rigidity and emergency running properties. Working temperature, depending on the material, up to +250°C or even +300°C.
		These retainer can also be ordered with our new retainer material **XTRAIon**, for even longer service life! Please find more information about **XTRAIon** on page 82.	

HIGH-PRECISION BALL BEARINGS

GRW retainer designation	Illustration	Description/ material	Scope of application / purpose
L1T **L2T**		L1T = outer ring separable, inner ring guided L2T =inner ring separable, outer ring guided	For separable angular contact ball bearings/ spindle bearings with highest speeds. High rigidity. Working temperature from -50 °C to +130 °C. Can be impregnated with oil.
L1TX **L2T**X **XTRAIon**		L1TX = outer ring separable, guided on inner ring L2TX = inner ring separable, outer ring guided X stands for a number and defines the material.	For separable angular contact ball bearings/ spindle bearings with highest speeds. High rigidity and emergency running properties. Working temperature, depending on the material, up to +250 °C or even +300 °C.
		These retainer can also be ordered with our new retainer material **XTRAIon**, for even longer service life! Please find more information about **XTRAIon** on page 82.	
TA/TB		Machined one-piece solid retainer made from fiber-reinforced phenolic resin. A = outer ring guided B = inner ring guided Only used with AC types. Non-separable.	For angular contact bearings/spindle ball bearings with highest speeds. High rigidity and emergency running properties. Working temperature from -50 °C to +130 °C. Can be impregnated with oil.
TX**A/T**X**B** **XTRAIon**		Machined one-piece solid retainer made from a special material. X stands for a number and defines the material. A = outer ring guided B = inner ring guided Only used with AC types. Non-separable.	For angular contact bearings/spindle ball bearings with highest speeds. High rigidity and emergency running properties. Working temperature, depending on the material, up to +250 °C or even +300 °C.
		These retainer can also be ordered with our new retainer material **XTRAIon**, for even longer service life! Please find more information about **XTRAIon** on page 82.	
VAC1 **VAC2**		Full complement bearing, without retainer, cannot be disassembled. VAC1 = shoulder relieved on outer ring VAC2 = shoulder relieved on inner ring Outer ring or inner ring shoulder ground on one side.	Used for medium speeds, high radial loads and high axial loads in one direction.
VF		Full complement ball bearing, without retainer, non-separable, with filling slot for inserting the balls.	Used for medium speeds and high radial loads.

As not every retainer is available for all sizes, please contact us for additional information. We will gladly recommend other bearing and retainer designs as well as retainer materials for special requirements.

GRW offers some of the highest performance synthetic materials including **Vespel®, Torlon®, PEEK, PTFE** and **Meldin®** as well as various metallic materials and phenolic resins.

In addition to using proven materials, GRW, in close co-operation with its customers and suppliers, is constantly developing new options or enhancing existing variations. As a result, GRW is the sole owner of some exclusive licenses and patents for using specifically developed retainer materials such as the new developed premium material **XTRAIon**. Detailed information concerning **XTRAIon** you can find on page 82.