

## HYDRAULIC FLAT TAPPET CAMS

**Common Usage:** Mild street performance to mild race

**Key Benefits:** Minimal maintenance, little or no valve train noise and economical cost

**Limitations:** Long-term wear, limited rpm range, lobe profile limitations

A popular street camshaft used with pre 1985s original overhead valve OEM engines, the hydraulic flat tappet cam is commonly used up to mildly aggressive performance profiles. The flat tappet lifter has a flat appearing base (this surface is actually slightly crowned) that rides on the cam lobe face, rotating slowly within the lifter bore to promote proper oiling. Internally, the lifter features a cavity that fills with oil and a piston that is depressed by the pushrod (and valve spring). This "hydraulic chamber" provides a cushion of fluid to soften the impact on the valve train, creating room for expansion as the engine reaches operating temperature. Hydraulic flat tappet camshafts deliver quiet operation at street to mild racing engine speeds. The biggest advantage to hydraulic flat tappet lifters is that they do not require constant maintenance to ensure proper valve lash. Hydraulic flat tappet camshafts/lifters are pre-loaded at initial start-up and require little, if any, maintenance from that point forward. Flat tappet lifters can only be used once per camshaft and must be replaced due to wear patterns created by the direct contact of the cam with the lifter base.

## SOLID/MECHANICAL FLAT TAPPET CAMSHAFTS

**Common Usage:** Moderate street performance to serious race

**Key Benefits:** Increased engine rpm and profile aggressiveness vs. economical cost of hydraulic flat tappet

**Limitations:** Long-term wear, periodic valve adjustment required

The original race engine lifter, solid (also referred to as mechanical) flat tappet camshafts feature more aggressive street performance or racing profiles and are capable of higher engine rpm than hydraulic flat tappet camshafts. As with the hydraulic flat tappet camshaft, the flat appearing lifter bottom follows the contours of the camshaft to operate the valve train components at the appropriate time, rotating within the lifter bore in a similar fashion to the hydraulic flat tappet lifter. The solid lifter does not have the internal cavity and piston found with the hydraulic lifter and does not expand or contract with engine temperature. Because of this feature, the solid lifter requires an initial cold valve lash setting and then adjustment after the engine has reached operating temperature (hot lash setting) to deliver the engine's top performance potential. Solid flat tappet lifters also feature a signature performance "ticking" sound, particularly when cold, that many performance fans like.

The lash setting is adjusted by using a set of feeler gauges to set the proper distance between the rocker arm tip and top of the valve stem when the lifter is on the base circle of the camshaft. Solid lifter camshafts require a certain level of valve lash maintenance at regular intervals. Flat tappet lifters can only be used once per camshaft and must be replaced due to wear patterns created by the direct contact of the camshaft with the lifter base.

**Special Note:** Flat tappet camshafts require a special break-in process to allow the lifters and camshaft to properly mate. These steps include (but are not limited to) using a suitable engine oil with a high Zinc (ZDDP) content (see page 272 for part numbers) and reducing valve spring pressure during break-in. For a complete, step-by-step break-in procedure, please call us toll free at 1-800-999-0853.



Flat Tappet Camshaft

Solid/Mechanical Flat Tappet Lifters

Hydraulic Flat Tappet Lifters