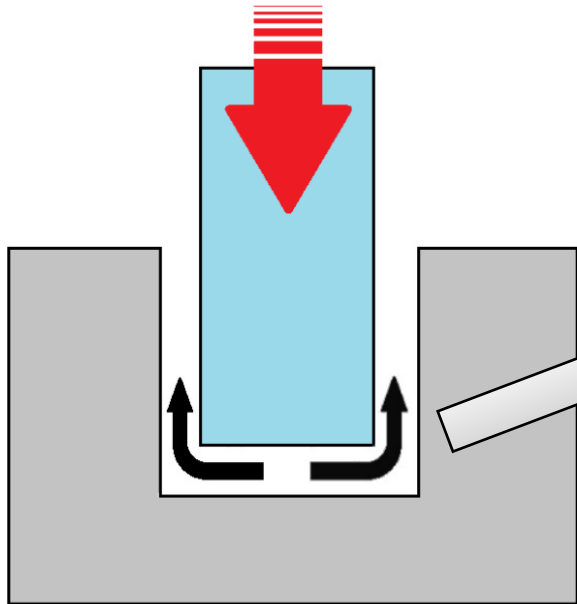


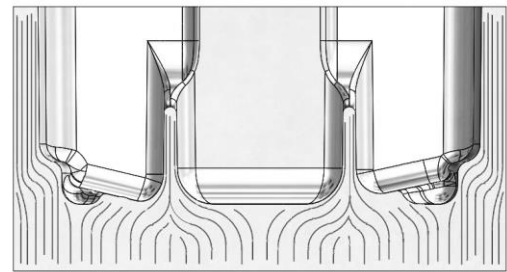
## WOSSNER ADVANTAGES OF FORGED ALUMINUM PISTON

Properties of forged aluminum pistons include improved mechanical properties:

- Durability – general term that defines the materials toughness
- Tensile strength – the strength of the material under load is improved
- Fatigue strength – how many cycles the material will survive / oscillations in the engine
- Ductility and resistance to impact – the ability to bend before breaking
- Condensed grain structure – all constituents are formed (compressed) closer together with a stronger bond to each other
- Feature aligned grain flow – the “grain” of the material flows into the workpiece shape, increasing the strength of each feature



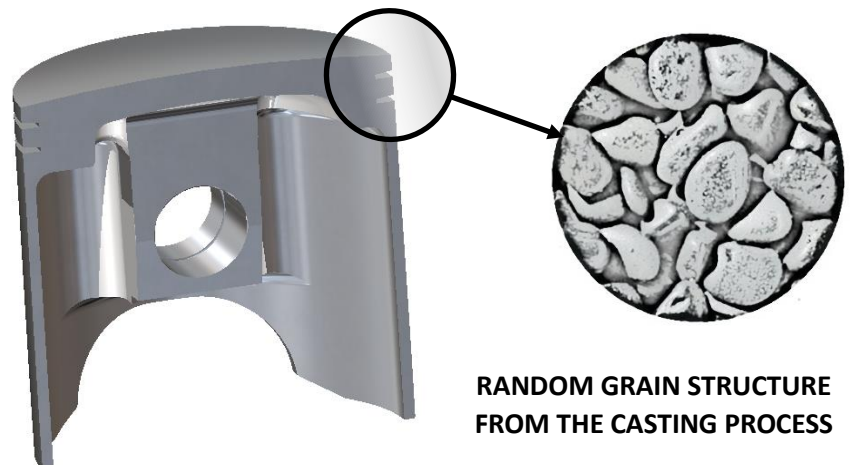
**WORKPIECE IS FORCED INTO PISTON SHAPE BY “SMASHING” THE ALUMINUM IN A FORGING DIE**



**GRAIN FLOW THROUGHOUT THE WORKPIECE AS THE RESULT OF THE FORGING PROCESS**

Properties of cast aluminum pistons:

- Lower density - no grain structure
- Less durable - brittle, lower yield levels
- Cracks, porosity, inclusions during forming
- Failure mode results in catastrophic component breakage



**RANDOM GRAIN STRUCTURE FROM THE CASTING PROCESS**