oval inlet valve seats

... and a possible cause

All beginnings are easy

During periodic maintenance, a pressure loss test should be carried out on the Rotax engine as scheduled.
Normally a routine check.

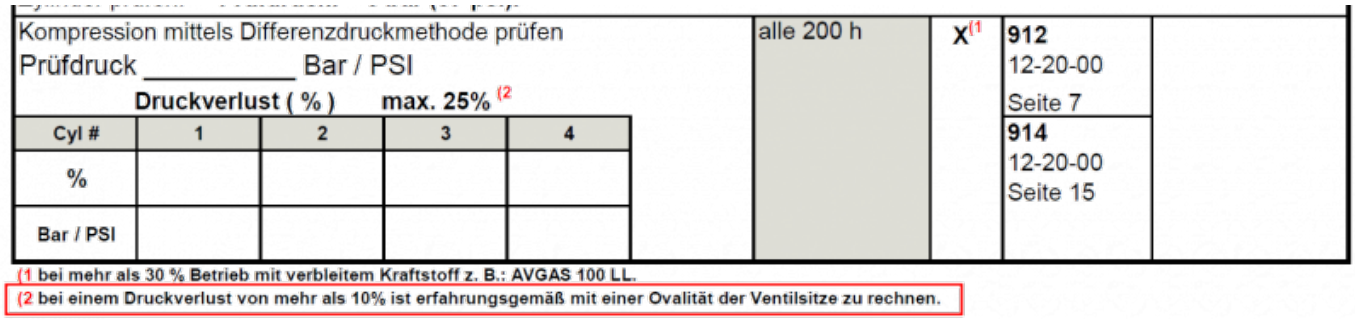
But wait - suddenly an increased pressure loss is detected. Not the usual 5% at first, but 8%.
... No cause for concern, because the manual states the following:

> The maximum permissible pressure drop is 25 %, e.g. from 6 to 4.5 bar (87 psi to 65 psi) (D).
>
> If the pressure loss is less than 25% then the valve seats and piston rings are working properly. The spark plug has to be installed according to Chapter 12–20–00 section Installation of spark plugs.
>
> If the value is over 25% inspection, repair or overhaul must be carried out in accordance with the BRP-Rotax instructions for continued airworthiness.
>
> - Detailed inspection of affected engine components.

Okay - 25%, I still have 18% in reserve

stop the beginnings

Anyone who has taken a maintenance course at Franz Aircraft Engines Vertrieb GmbH or used my maintenance checklist will come across the following statement:



Kompression mittels Differenzdruckmethode prüfen Prüfdruck _____ Bar / PSI **Druckverlust (%)** **max. 25%** (2					alle 200 h	X(1	**912** 12-20-00 Seite 7 **914** 12-20-00 Seite 15
Cyl #	**1**	**2**	**3**	**4**			
%							
Bar / PSI							

(1 bei mehr als 30 % Betrieb mit verbleitem Kraftstoff z. B.: AVGAS 100 LL.
(2 bei einem Druckverlust von mehr als 10% ist erfahrungsgemäß mit einer Ovalität der Ventilsitze zu rechnen.

o o p s - what does it say under footnote 2:?
(2 With a pressure loss of more than 10%, experience has shown that ovality of the valve seats is to be expected.

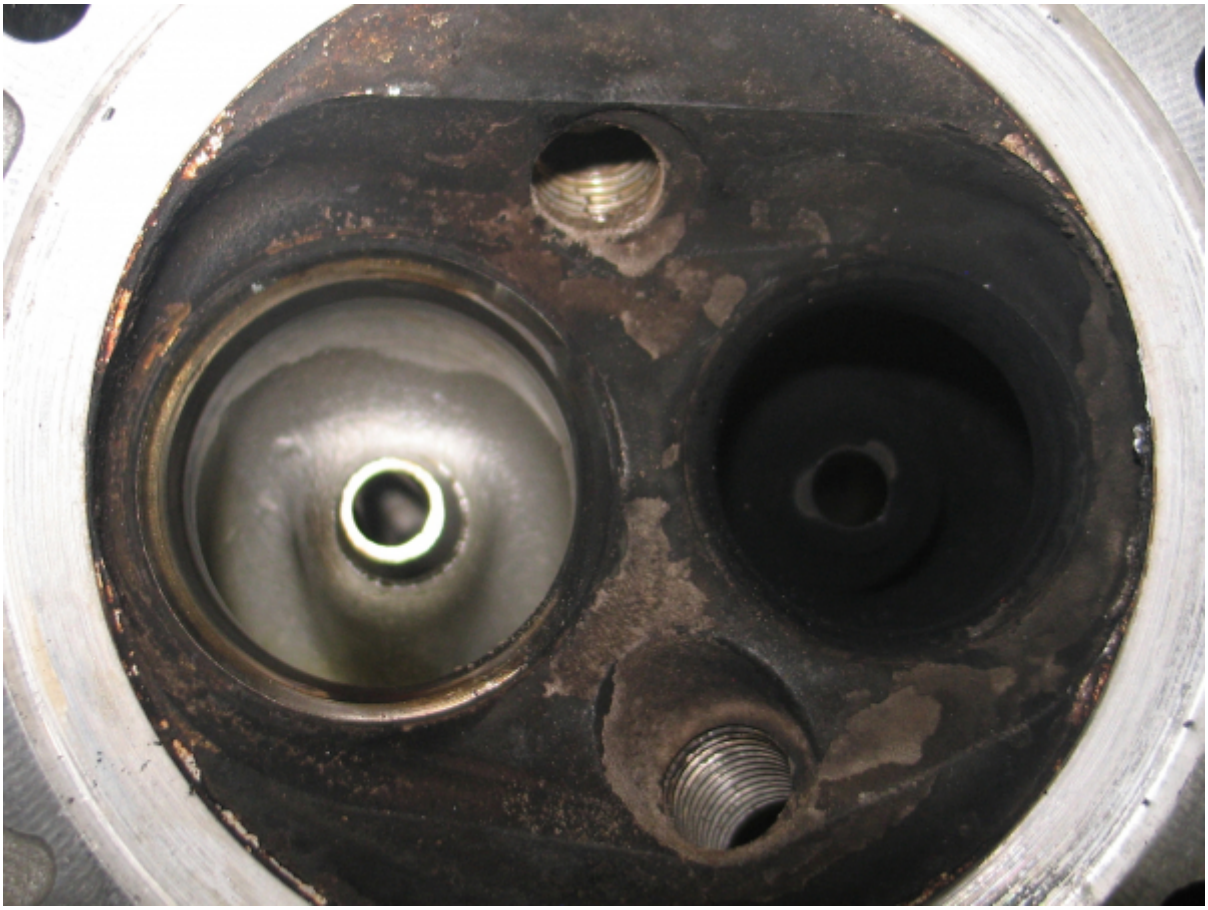
It is up to each individual to decide whether to act or not.
What is certain is that the most common cause of increased pressure loss is ovality of the inlet valve

seats.

How does that happen?

Unfortunately, this is usually due to the installation situation.
The engine is constantly working at the thermal upper operating limit and the operator may still have difficulty making adjustments.
Let's leave out the operator and look at the following picture:

Here we can clearly see a black area on the inlet valve seat. The valve is no longer working properly there and the combustion gases are escaping. Here we have the measured pressure loss.
The running time of the engine was approx. 400 hours, the pressure loss was 18%.
From another perspective:



why act at 10%?

An example with a measured pressure loss of 10%.
The black area on the valve seat is clearly visible. It doesn't look too bad yet, but the ovality is on the rise.
As you can imagine, it is not only the valve seat that suffers, but also the valve's inability to dissipate heat.

Conclusion

…. The early bird catches the worm!

In the last example, you still have the option of grinding in the valve to make it tight again. The cylinder head in the first two pictures can only be repaired by re-milling the valve seat.

**So - if the pressure loss reaches double figures during engine maintenance, remove the head and carry out the necessary repair.

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