**SQUISH & TIMING CONTROL PROCEDURE**

**General method for measuring the squish height on a L-ring piston.**

1. Remove the engine from the chassis
2. The engine must be in racing conditions, no combustion chamber cleaning allowed
3. Remove the spark plug
4. Wait until the engine is at ambient temperature

5. Prepare a segment of tin wire, with the following characteristics:

a. diameter 1.5-1.6mm (use tin wire with the highest possible percentage of tin in the alloy (the best is 99%), possibly without a deoxidizing acid core.)
b. total length approximately 100mm
c. 90-120° bend at about 40mm from one tip (the tip to be inserted into the cylinder head)
d. This way you will have an almost horizontal segment, about 40mm long, to be inserted into the combustion chamber, and a vertical segment acting as a handle
e. The tip to be introduced must be cut carefully and square

6. Move the piston approximately 10mm from T.D.C.

7. Looking at the engine from above, the tin must be inserted via the spark plug hole with the horizontal segment parallel to the piston pin (also parallel to the crankshaft), towards the left or right. It must be inserted until the tip gets in contact with the liner

8. The checking must be done one side at a time, not two sides at the same time

9. Rotate the crankshaft, by hand or by using a wrench, and take the piston to T.D.C. and beyond, crushing the tin

10. Immediately, rotate the crankshaft in the opposite direction, to crush the tin a second time

11. Keep the tin firmly in contact with the cylinder liner, during operation

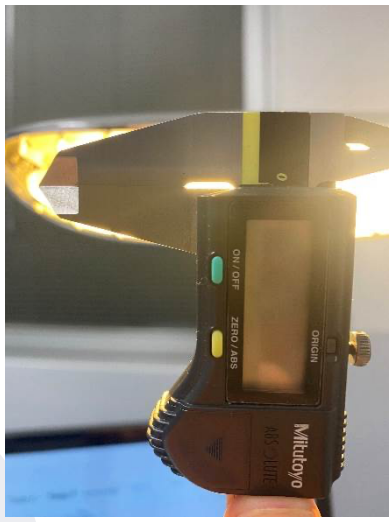
12. Carefully extract the tin from the spark plug hole

13. Look at the tin's end:

a. At the tip a **step** must be present, created by the piston ring seat between piston and liner
b. Before the step, a **flat area** must be present, created by piston crown and cylinder head, which squeezed the tin.
c. If these details are not detectable, prepare another tin portion and repeat from point 5

14. Prepare a good quality caliper, with resolution of 1/100mm, either digital or mechanical with dial gauge

15. As the thin edges on the caliper will be used, it is necessary to check its zero specifically on the thin edges:




Clean the tips of the caliper, close it completely, place it towards the light and check for any space left between the tips. To eliminate this space, if necessary, adjust the parallelism of the tips by acting on the two specific screws.

Preferably have available a 1mm gauge. Measure it with the caliper's edge and see the dimension visualized, if the reading is not 1mm then zero the caliper to the 1.00mm gauge, then add 1mm to any reading.

Verify that the width of the thin part of the caliper tips measures 1 mm or less (see arrow). This is extremely important as a thicker rim leads to a higher (false) Squish reading.

16. Carefully pinch the tin's end exactly at the end of the flat area just before the step. Push carefully on the caliper
17. While keeping a soft pressure on the caliper, gently move the tin with your fingers allowing the caliper to arrive at the thinnest position. This is the squish reading.
18. Repeat the operations from point 5 to 17, on the opposite side.

**The smallest reading between left and right side is the valid squish height.**

**General method for measuring the squish height on a flat-ring piston.**

1. Remove the engine from the chassis
2. The engine must be in racing conditions, no combustion chamber cleaning allowed
3. Remove the spark plug
4. Wait until the engine is at ambient temperature
5. Prepare a segment of tin wire, with the following characteristics:
    a. diameter 1.5-1.6mm
    b. total length approximately 100mm
    c. 90-120° bend at about 40mm from one tip (the tip to be inserted into the cylinder head)
    d. This way you will have an almost horizontal segment, about 40mm long, to be inserted into the combustion chamber, and a vertical segment acting as a handle
    e. The tip to be introduced must be cut carefully and square
6. Move the piston approximately 10mm from T.D.C.
7. Looking at the engine from above, the tin must be inserted via the spark plug hole with the horizontal segment parallel to the piston pin (also parallel to the crankshaft), towards left or right. It must be inserted until the tip gets in contact with the liner
8. The checking must be done one side at a time, not two sides at the same time
9. Rotate the crankshaft, by hand or by using a wrench, and take the piston to T.D.C. and beyond, crushing the tin
10. Immediately, rotate the crankshaft in the opposite direction, to crush the tin a second time
11. Keep the tin firmly in contact with the cylinder liner, during operation
12. Carefully extract the tin from the spark plug hole
13. Look at the tin's end:
    a. At the tip a small step must be present, created by the chamfer at the piston's edge
    b. Before the step, a flat area must be present, created by piston crown and cylinder head, which squeezed the tin.
    c. If these details are not detectable, prepare another tin portion and repeat from point 5
14. Prepare a good quality caliper, with resolution of 1/100mm, either digital or mechanical with dial gauge
15. As the thin edges on the caliper will be used, it is necessary to check its zero specifically on the thin edges:
    a. Preferably have available a 1mm gauge. Measure it with the caliper's edge and see the dimension visualized, if the reading is not 1mm then zero the caliper to the 1.00mm gauge, then add 1mm to any reading.
    b. If a 1mm gauge is not available, at least clean the caliper's edges, close the caliper completely, hold up to the light and check for any gap left between the edges. If needed adjust the caliper's parallelism by adjusting the specific screws
16. Carefully pinch the tin's end exactly at the end of the flat area just before the small step. Push carefully on the caliper
17. While keeping a soft pressure on the caliper, gently move the tin with your fingers allowing the caliper to arrive at the thinnest position. This is the squish reading.
18. Repeat the operations from point 5 to 17, on the opposite side.

**The smallest reading between left and right side is the valid squish height.**

**SUPPLEMENTARY TIMING CHECKING ON X30 WATERSWIFT 60cc**

**Differential reading between exhaust and inlet**

1. Install the graduated disc or the encoder onto the crankshaft
2. Insert the feeler gauge (wedge) 0.2x5mm at the center of inlet port
3. Rotate the crankshaft counterclockwise (seen from clutch side), and take the piston skirt in contact with the feeler gauge
4. Set to zero the graduated disc or the encoder
5. Rotate the crankshaft clockwise enough to lift the piston and release the feeler gauge
6. Rotate the crankshaft counterclockwise to lower the piston until the exhaust port is open
7. Insert the feeler gauge in center of the exhaust port
8. Rotate the crankshaft clockwise and take the piston ring in contact with the feeler gauge
9. Check the disc or encoder reading. to be legal it must be minimum 30° and maximum 31°

**Differential reading between exhaust and transfers**

1. Install the graduated disc or the encoder onto the crankshaft
2. Insert the feeler gauge (wedge) 0.2x5mm at the center of exhaust port
3. Rotate the crankshaft clockwise (seen from clutch side) and take the piston ring in contact with the feeler gauge
4. Set to zero the graduated disc or the encoder
5. Rotate the crankshaft counterclockwise to lower the piston until the transfer ports are open
6. Insert the feeler gauge into one of the transfer ports
7. Rotate the crankshaft clockwise and take the piston ring in contact with the feeler gauge
8. Check the disc or encoder reading. to be legal it must be minimum 19.5° and maximum 20.5°

**SUPPLEMENTARY TIMING CHECKING ON IAME X30 125CC**

**Differential reading between exhaust and transfers**

1. Install the graduated disc or the encoder onto the crankshaft
2. Insert the feeler gauge (wedge) 0.2x5mm at the center of exhaust port
3. Rotate the crankshaft clockwise (seen from clutch side) and take the piston ring in contact with the feeler gauge
4. Set to zero the graduated disc or the encoder
5. Rotate the crankshaft counterclockwise to lower the piston until the transfer ports are open
6. Insert the feeler gauge into one of the transfer ports
7. Rotate the crankshaft clockwise and take the piston ring in contact with the feeler gauge
8. Check the disc or encoder reading. To be legal it must be: minimum 24° / maximum 25°

**SUPPLEMENTARY TIMING CHECKING ON IAME REEDJET KA100 100CC**

**Differential reading between exhaust and transfers**

1 Install the graduated disc or the encoder onto the crankshaft

2 Insert the feeler gauge (wedge) 0.2x5mm at the center of exhaust port

3 Ruotando l'albero motore in senso orario visto dal lato frizione portare il pistone a contatto con lo spessimetro

4 Set to zero the graduated disc or the encoder

5 By rotating the crankshaft anti-clockwise, lower the piston to free the feeler gauge and open the additional exhaust ports (booster)

6 Insert the feeler gauge into a booster

7 Rotating the crankshaft clockwise, raise the piston until it comes into contact with the feeler gauge

8 The goniometer reading must be a minimum of 20.5° and a maximum of 21.5°

**SUPPLEMENTARY TIMING CHECKING ON IAME S125 125cc**

**Exhaust-booster jump control**

1. mount the goniometer on the crankshaft
2. Insert the 0.2x5mm feeler gauge into the center of the exhaust port
3. by rotating the crankshaft clockwise seen from the clutch side, bring the piston into contact with the feeler gauge
4. zero the caliber
5. by rotating the crankshaft anticlockwise, lower the piston to free the feeler gauge and open the additional exhaust ports (booster)
6. Insert the feeler gauge into a booster
7. by rotating the crankshaft clockwise, raise the piston until it comes into contact with the feeler gauge
8. the goniometer reading must be a minimum of 2.2° and a maximum of 3.2°

**Differential reading between exhaust and transfers**

1 Insert the 0.2x5mm feeler gauge into the center of the exhaust port
2 by rotating the crankshaft clockwise, bring the piston into contact with the feeler gauge
3 zero the caliber
4 by rotating the crankshaft anticlockwise, lower the piston so as to free the feeler gauge and open the main transfer ports
5 Insert the feeler gauge into a transfert port
6 by rotating the crankshaft clockwise, raise the piston until it comes into contact with the feeler gauge
7 the goniometer reading must be a minimum of 24.8° and a maximum of 25.8°

**Differential reading between exhaust and secondary transfers**

1 Insert the 0.2x5mm feeler gauge into the center of the exhaust port
2 by rotating the crankshaft clockwise, bring the piston into contact with the feeler gauge
3 zero the caliber
4 by rotating the crankshaft anticlockwise, lower the piston so as to free the feeler gauge and open the secondary transfer ports
5 Insert the feeler gauge into a transfert port
6 by rotating the crankshaft clockwise, raise the piston until it comes into contact with the feeler gauge
7 the goniometer reading must be a minimum of 25.6° and a maximum of 26.6°