

# Service Bulletin

**Types | 2, 3, 4**

**Subject | Quench Area Optimisation**

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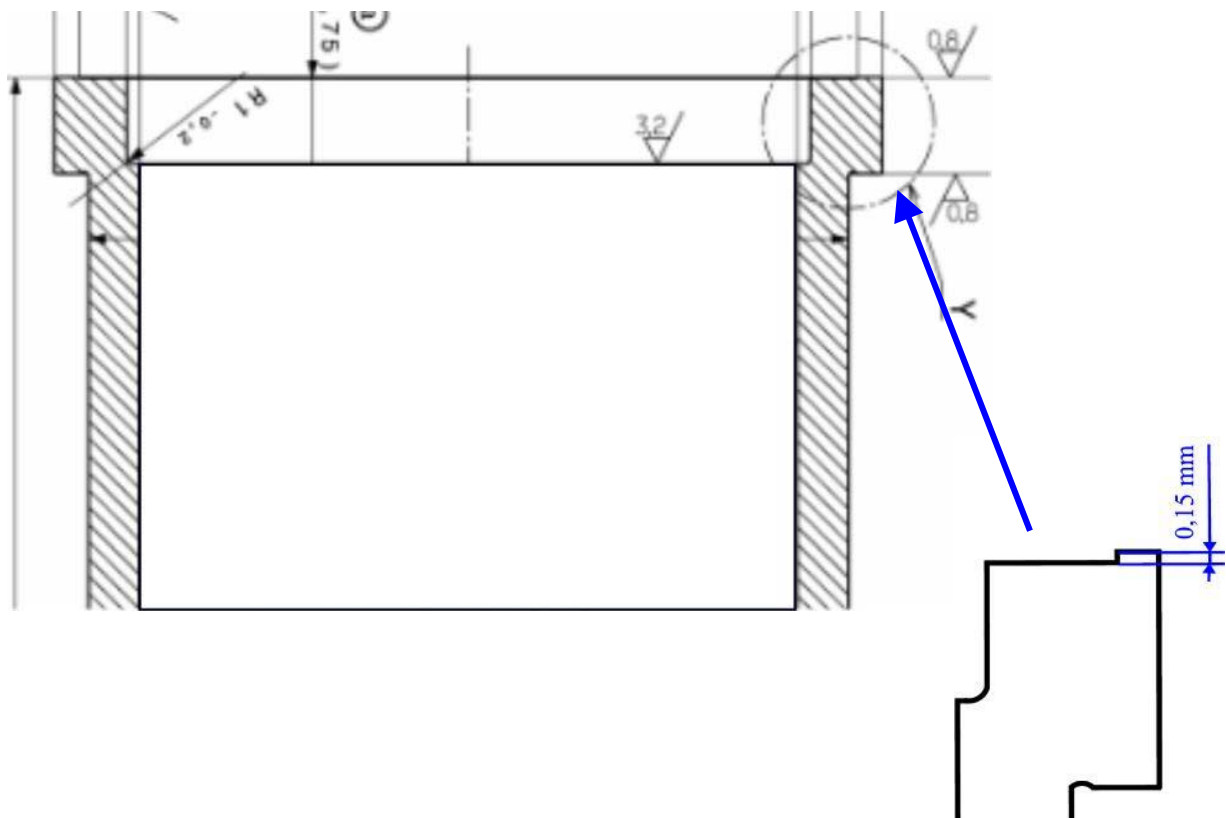
The current production lines of types 2, 3 and 4 include many improvements and adaptations to the requirements of the market. One of these innovations is a **quench area optimisation**, which appears in the production line for the first time this year. The use of quench area optimised piston - cylinder liner combination offers major improvements in terms of

- Reduction of CO and HC emission  
and
- efficiency optimisation.

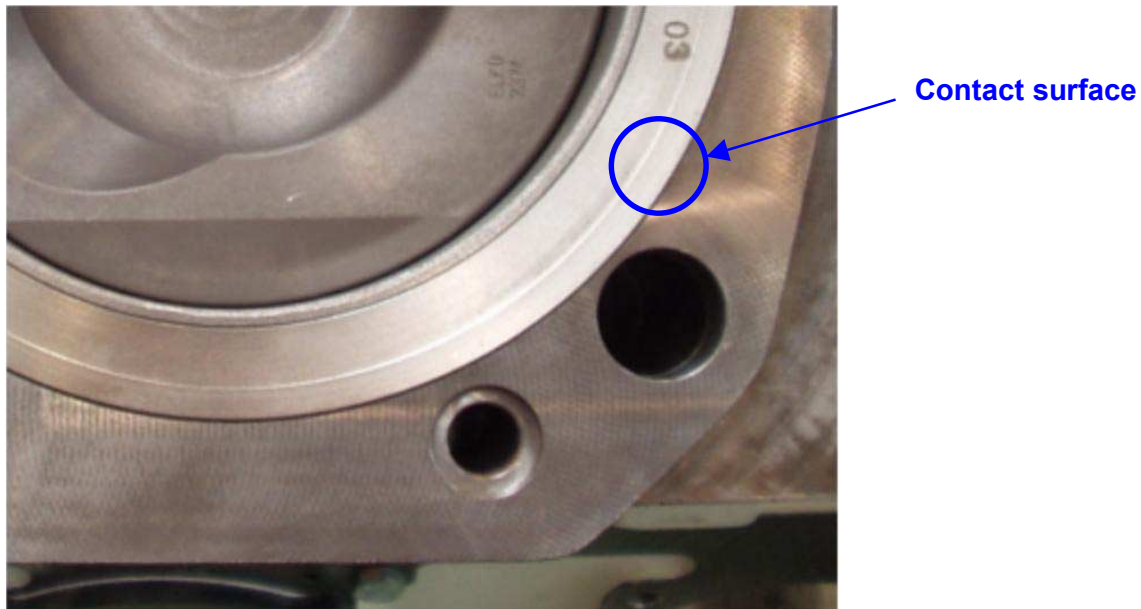
These improvements were possible because of design changes to piston and cylinder liners. In detail there are 2 major innovations:

### 1. No separate cylinder head gasket

The cylinder liner was designed so that the previously used gasket is integrated within the liner. Therefore **no separate cylinder head gasket is required any more**, instead there is a shoulder with a height of 0.15 mm at end face of the cylinder liner. Due to this design the gap between head and liner could be decreased considerably, what nearly comes up to a total elimination of the quench area in this zone.

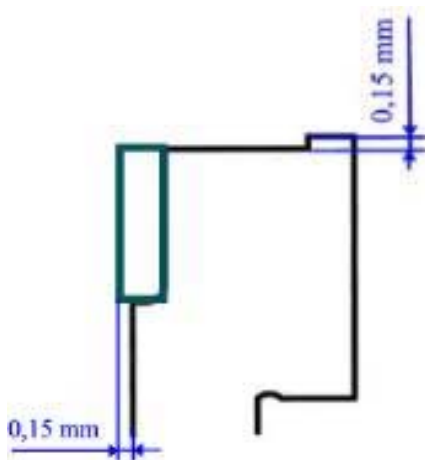


On assembling, carefully clean the contact surface before fitting the cylinder head to ensure correct sealing. If the contact surface is mechanically damaged (scratched) it is imperative to replace the cylinder liner since appropriate sealing is no longer guaranteed!



## 2. Modification of scraper ring thickness

To minimize the quench area beneath the scraper ring, inner diameter of the scraper was increased. Instead of 0.3 mm the scraper rages only 0.15 mm into the cylinder bore. Due to this a decrease of the distance between piston-fire land and cylinder liner could be achieved.



Because of the modified scraper ring of course the accompanying piston had to be adapted. Therefore it is absolutely necessary to verify the solidarity of these components before assembling! A mixed assembly of "old" und "new" components is absolutely forbidden and may lead to considerable damages.

For identification a listing of partnumbers of quench-area-optimized components of production line 2003.

Type	Cylinder linder cpl.	Cylinder liner	Scraper ring	Piston	
2	341173	341174	337459	351319	$\epsilon=12$
				375406	$\epsilon=10$
3	337326	337332	337459	375589	$\epsilon=12,5$
				375591	$\epsilon=11,8$
				375593	$\epsilon=11,2$
4	334991	334992	334993	376292	$\epsilon=12,5$
				376312	$\epsilon=12,5$

### Modification of firing land at the upper edge of the 1st ring carrier (at the moment type 3 only)

This accompanying measure serves to avoid collisions of lower edge scraper ring with upper edge ring carrier when occurrence of tear at the firing land. By this ensurance of scraper ring clearance especially with landfill gas plants was achieved.

This is the current serial-piston of type 3 engines including heart-shaped recess, quench area optimization and **modified upper piston ring carrier**:

