



Ragasco Composite Propane Cylinders

# Appendix 1 - Criteria for Cylinder Inspection



If you have questions or need technical assistance,  
please contact [cylinders@wthg.com](mailto:cylinders@wthg.com)



**WORTHINGTON  
ENTERPRISES**

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# 1. Types of Cylinders and Casing Damage

The pictures below (also see: Composite LPG Cylinders Part 4 – Inspection and Maintenance, Table 1) are examples of the various types of damage that occur to cylinders and casing. (Please disregard the pen-marking on some of the pictures - for HERAG internal use). Please note that all evaluations are done from a safety standpoint only. The operator may have commercial and marketing issues leading to stronger reactions to the damaged than those described in the table.

***Important: If replacing protective casing lower part or handle, the composite exposed during removal must be thoroughly inspected by trained personnel.***

	<p><b>Damage on handle “skirt”, and lower part</b></p>	<p><b>Replace handle and casing lower part.</b></p>
	<p><b>Damage on handle “skirt”, and potentially casing lower part.</b></p>	<p><b>Replace handle and potentially casing lower part.</b></p>

	<p><b>Damage on casing lower part.</b></p>	<p><b>Replace casing lower part.</b></p>
	<p><b>Damage on handle "skirt", typically beside the snap</b></p>	<p><b>Replace handle</b></p>
	<p><b>Damage on handle "skirt" and potentially casing lower part.</b></p>	<p><b>Replace handle and potentially casing lower part.</b></p>

	<p><b>Damage on handle "skirt" and casing lower part.</b></p>	<p><b>Replace handle and casing lower part.</b></p>
	<p><b>Ring and handle part broken → impossible to replace ring</b></p>	<p><b>Replace ring and handle</b></p>

Photo courtesy of  
PrestaCylinders

	<p><b>Crack on ring and handle part. Potentially rough handling.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p><b>Replace ring and handle.</b></p>
	<p><b>Ring and handle damaged</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p><b>Replace ring and handle</b></p>
	<p><b>Impact on handle part of casing</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p><b>Replace handle</b></p>

	<p><b>Impact on handle part and potentially casing lower part</b></p> <p>Photo courtesy of <a href="#">PrestaCylinders</a></p>	<p><b>Replace handle and casing lower part</b></p>
	<p><b>Impact on handle part and potentially casing lower part</b></p> <p>Photo courtesy of <a href="#">PrestaCylinders</a></p>	<p><b>Replace handle and casing lower part</b></p>
	<p><b>Composite damaged due to impact or abrasion. Casing lower part broken, potentially also snap on handle part.</b></p> <p>Photo courtesy of <a href="#">PrestaCylinders</a></p>	<p><b>Reject.</b></p>

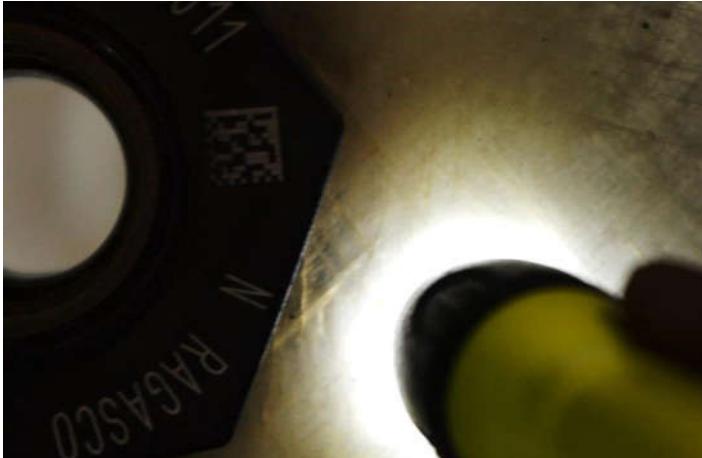
	<p><b>Casing lower part broken because of composite uneven surface.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p>No action</p>
	<p><b>Damage to casing lower part. No visual impact on fibre.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p>Replace casing lower part.</p>
	<p><b>Damage to fibre and casing lower part.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p>Reject</p>

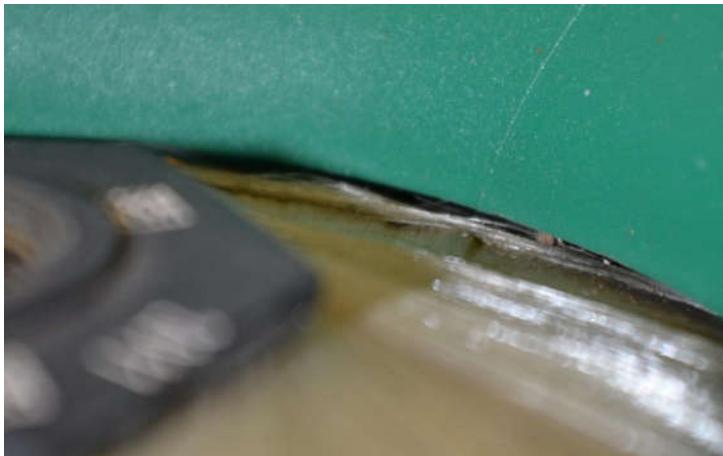
	<p><b>Casing lower part broken without any sign of impact</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>
	<p><b>Casing lower part foot-ring deformed (no cracks in the bottom area casing or composite detected)</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>
	<p><b>Casing lower part foot-ring deformed (no cracks in the bottom area casing or composite detected)</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>

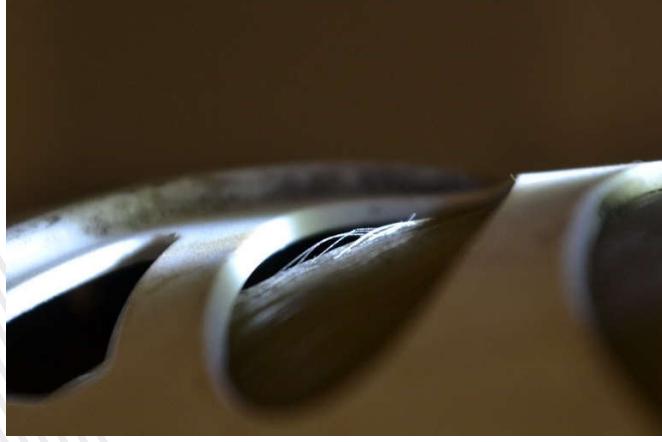
	<p><b>Casing lower part foot-ring cracked</b></p>	<p><b>Replace casing lower part.</b></p>
	<p><b>Casing lower part foot-ring cracked</b></p>	<p><b>Replace casing lower part.</b></p>
	<p><b>Casing lower part foot-ring cracked</b></p>	<p><b>Replace casing lower part.</b></p>

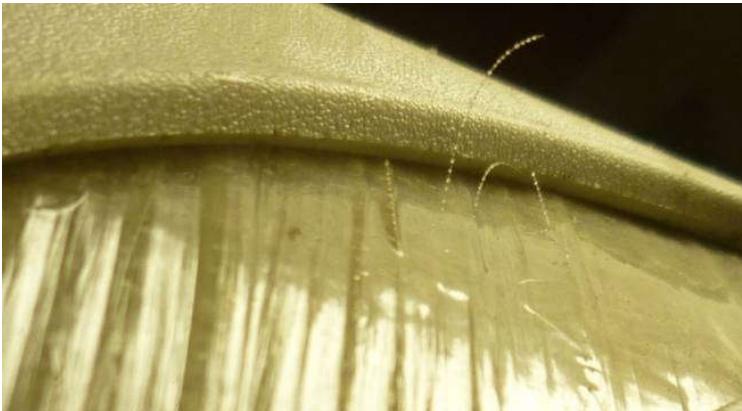
	<p><b>Casing lower part foot-ring cracked</b></p>	<p><b>Replace casing lower part.</b></p>
	<p><b>Casing lower part foot-ring cracked</b></p>	<p><b>Replace casing lower part.</b></p>
	<p><b>Casing lower part cylindrical area damaged</b></p>	<p><b>Replace casing lower part.</b></p>

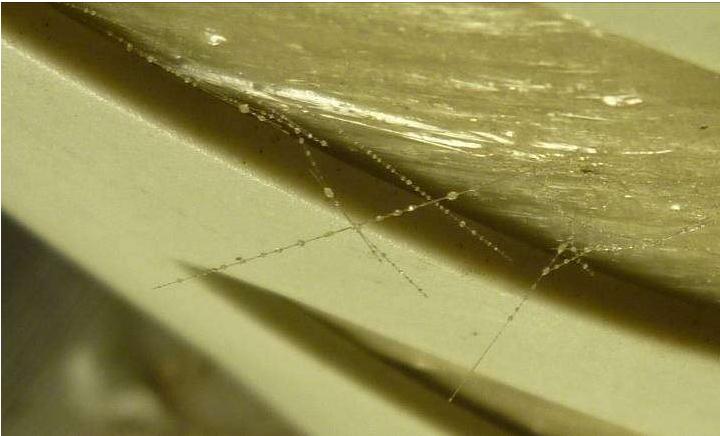
	<b>Impact on handle part of casing</b>	<b>Replace casing lower part.</b>
	<b>Casing lower part cylindrical area damaged</b>	<b>Replace casing lower part.</b>
	<b>Casing lower part cylindrical area damaged</b>	<b>Replace casing lower part.</b>

	<p><b>Casing lower part cylindrical area damaged</b></p> <p><b>Replace casing lower part.</b></p>	
	<p><b>Fiber broken under flange</b> (Comment: Resin may be broken to this level with no relevant effect on safety)</p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p><b>Fiber broken (or in doubt)</b> → Reject</p> <p>Only limited resin crack &lt;50mm = No action.</p>
	<p><b>Fiber broken under flange</b> (Comment: Resin may be broken to this level with no relevant effect on safety)</p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p><b>Fiber broken (or in doubt)</b> → Reject</p> <p>Only limited resin crack &lt;50mm = No action.</p>

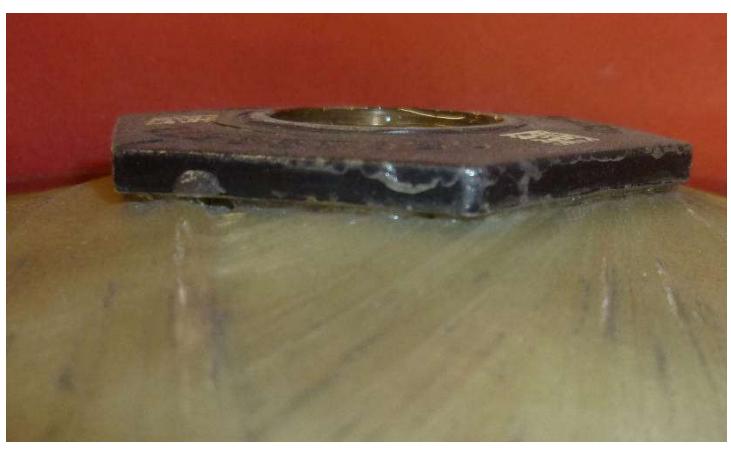
	<p><b>Fiber peeled on top</b></p>	<p><b>No action</b></p>
	<p><b>Fiber peeled under plastic top part</b></p>	<p><b>No action</b></p>
	<p><b>Fiber peeled on vertical part (Comment: Not affecting cylinder behavior, Cutting the loose strand with a knife/scissors is recommended to avoid customers hurting themselves).</b></p>	<p><b>No action</b></p>

	<p><b>Fiber peeled on vertical part</b></p>	<p>No action</p>
	<p><b>Fiber peeled on vertical part</b></p>	<p>No action</p>
	<p><b>Fiber peeled on vertical part</b></p>	<p>No action</p>

	<p><b>Fiber peeled on vertical part</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p>No action</p>
	<p><b>Fiber peeled on vertical part</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p>No action</p>
	<p><b>Fiber peeled on vertical part</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p>No action</p>

	<p><b>Fiber peeled on vertical part</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>
	<p><b>Fiber peeled on lower part</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>
	<p><b>Fiber broken under foot ring, not in combination with outer damage (Comment: an irregularity from production, not affecting safety. If in combination with signs of hard use or other damage, the cylinder shall be rejected)</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>

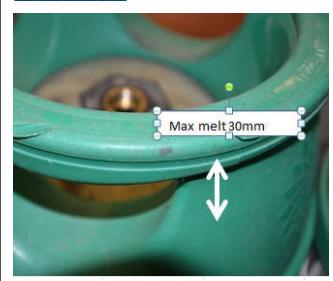
	<p><b>Fiber scratched under foot ring</b></p>	<p><b>No action</b></p>
	<p><b>Fiber dried and brittle on flange</b></p>	<p><b>No action</b></p>
	<p><b>Fiber dried and brittle on centering piece</b></p>	<p><b>No action</b></p>
	<p><b>Waves on composite side wall from production.</b></p>	<p><b>No action</b></p>

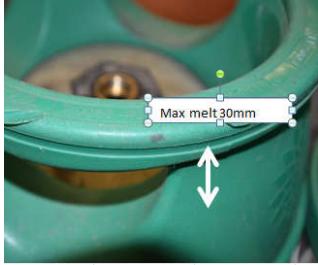
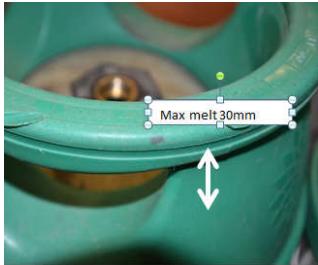
	<p><b>Small edge from “fiber stop / end” during manufacturing</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>
	<p><b>Hexagonal flange touching composite (normal)</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>
	<p><b>Resin and laminate build up under boss is within the in the low side of the tolerance.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>No action</b>

	<p><b>Lack of surface resin on fiber (Comment: This low quality photo does not illustrate the situation well...)</b></p>	<p>No action</p>
	<p><b>Air to in the surface layer of composite, not into the lower layers.</b></p>	<p>Area less than 60mm x 60mm = No action.</p>
	<p><b>Some delamination, Not in combination with surface damage =&gt; no action.</b></p>	<p>No action</p>

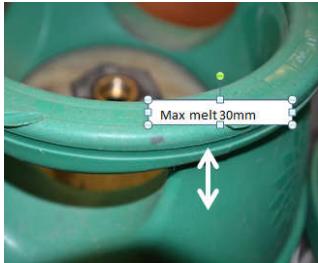
	<p><b>Fiber tow standing somewhat out</b></p>	<b>No action</b>
	<p><b>Delamination, not in combination with signs of impact.</b></p> <p>&lt; 30% surface of cylinder = OK.</p> <p>&gt;30% → reject</p>	
	<p><b>Excess thickness of resin (normal).</b></p>	<b>No action</b>

	<p><b>Resin and laminate build up within the bottom is in the in the low side of the tolerance.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p>No action</p>
	<p><b>Fiber broken</b></p>	<p><b>Reject</b></p>
	<p><b>Ring and possibly handle melted / burned, but not lower than 15 mm from the interface between ring and handle.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p>Replace ring and possibly handle</p>

	<p><b>Ring melted / burned</b>  <b>(Comment: Actual picture is from G1, replacement is not possible – only on cylinders with mechanical snap).</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p><b>Replace ring</b></p>
	<p><b>Ring and possibly handle melted / burned, but not lower than 15 mm from the interface between ring and handle</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<p><b>Replace ring and possibly handle</b></p>
	<p><b>Ring and handle melted / burned lower than 30 mm from the interface between ring and handle. No sign of heat to boss or composite.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p> 	<p><b>Reject</b></p>

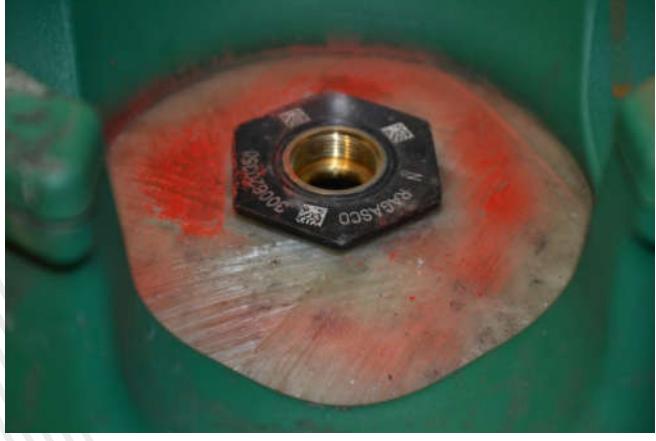
	<p><b>Ring and handle part melted, no heat indication on boss or composite.</b></p>  <p>Photo courtesy of PrestaCylinders</p>	<p><b>Replace ring and handle.</b></p>
	<p><b>Ring and handle melted / burned lower than 30 mm from the interface between ring and handle</b></p>  <p>Photo courtesy of PrestaCylinders</p>	<p><b>Reject</b></p>
	<p><b>Handle part of casting melted due direct exposure to hot object on small area. not close to snap/skirt, no marking damaged, no heat indication on boss or composite</b></p> <p>Photo courtesy of PrestaCylinders</p>	<p><b>Replace handle</b></p>

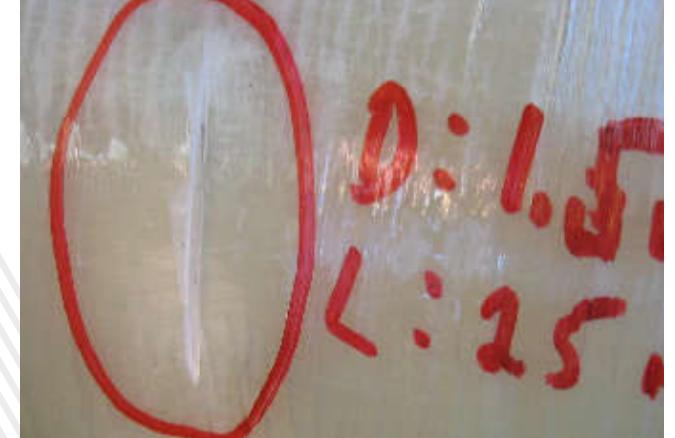
	<p><b>Handle and casing lower part melted.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>Reject.</b>
	<p><b>Handle and casing lower part melted.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>Reject.</b>
	<p><b>Handle and casing lower part melted.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>Reject.</b>

	<p><b>Casing lower part melted.</b></p> <p><small>Photo courtesy of PrestaCylinders</small></p>	<b>Reject</b>
	<p><b>Ring and possibly handle melted, less than 30 mm below the interface between ring and handle. No indication of heat on boss and composite</b></p> 	<b>Replace handle</b>
	<p><b>Ring and handle melted.</b></p>	<b>Reject</b>

	<p><b>Moisture between fiber and casing, no signs of chemical degeneration (no resin soft spots or significant discoloring)</b></p>	<p><b>No action</b></p>
	<p><b>Rust on plastic</b></p>	<p><b>No action</b></p>
	<p><b>Glue from sticker or similar, on casing parts</b></p>	<p><b>No action</b></p>

	<b>Black dirt</b>	<b>Clean</b>
	<b>Grease and black dirt</b>	<b>Clean</b>
	<b>Grease</b>	<b>Clean</b>

	<b>Cement</b>	<b>Clean</b>
	<b>Lot of dirt</b>	<b>Clean</b>
	<b>Spray on top</b>	<b>No action</b>

	<b>Paint</b>	<b>No action</b>
	<b>Light spray</b>	<b>No action</b>
	<b>Cut fiber, more than one fibre tow. (Comment: See table in section 7 for details and limits).</b>	<b>Reject</b>

	<p><b>Damage from abrasion</b> (Comment: See table in section 7 for details and limits).</p>	<b>Reject</b>
	<p><b>Impact damage in combination with de-lamination and surface defects.</b></p>	<b>Reject</b>
	<p><b>Impact damage in combination with de-lamination and surface defects.</b></p>	<b>Reject</b>

	<p><b>Delamination and no surface damage.</b></p>	<p><b>No action</b></p>
	<p><b>Intra-laminar delamination due to pressure cycling &gt;12000 cycles to proof pressure. If less than approximately 100 hairlines, it is acceptable.</b></p>	<p><b>Reject</b></p>
	<p><b>Intra-laminar delamination due to pressure cycling &gt;12000 cycles to proof pressure. If less than approximately 100 hairlines, it is acceptable.</b></p>	<p><b>Reject</b></p>

	<p>Stretch-mark / white line in the liner at cylindrical / dome transition area (internal inspection). Usually in combination with partial lack of adhesion between liner and composite wrapping.</p>	Reject
	<p>Stretch-mark / white line in the liner at cylindrical / dome transition area (internal inspection). Usually in combination with partial lack of adhesion between liner and composite wrapping (whitish area in the picture).</p>	Reject
	<p>Crack in the liner at cylindrical / dome transition area (internal inspection).</p>	Reject