

Title (en)  
Metallic hollow valve

Title (de)  
Metallisches Hohlventil

Title (fr)  
Soupape creuse métallique

Publication  
**EP 2803827 B1 20151118 (DE)**

Application  
**EP 14152509 A 20140124**

Priority  
DE 102013203443 A 20130228

Abstract (en)  
[origin: CN104018904A] The invention relates to a metal coreless valve (1) of an internal combustion engine. The valve is provided with a tubular shaft (2) with a cavity and a valve head (3) connected with the tubular shaft. The followings are necessary: the external diameter da of the shaft (2) is larger than 5.0 mm and smaller than 6.0 mm, and internal diameter di is larger than 3.0 mm and smaller than 4.6 mm. A cavity (4) is provided in the valve head (3). The thickness b1,2 of the wall surrounding the cavity (4) is larger than 1.0 mm and smaller than 2.0 mm. Thus, the coreless valve (1) is manufactured, and the coreless valve (1) can be cooled preferably, thereby improving limit of detonability.

IPC 8 full level  
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CPC (source: EP)  
**F01L 3/14** (2013.01); **F01L 3/20** (2013.01)

Citation (opposition)  
Opponent : Federal-Mogul Valvetrain GmbH  
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• US 2009081073 A1 20090326 - BARBOSA CELSO ANTONIO [BR], et al  
• TRW AUTOMOTIVE, ENGINE COMPONENTS, HANDBOOK, 1993  
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DOCDB simple family (publication)  
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**DE 102013203443 A 20130228**; CN 201410053267 A 20140217; EP 14152509 A 20140124; JP 2014030232 A 20140220;  
KR 20140023156 A 20140227