Metasul® LDH™ Large Diameter Head

Enhancing stability and increasing range of motion

zimmer
Confidence in your hands®

The *Metasul* large diameter head technology is the result of in-depth research, development and clinical experience that began in 1988.

LDH

large diameter head

Metasul Metal-on Technolo

The use of large diameter heads increases the displacement distance that must be traversed before dislocation occurs, thereby increasing joint stability and, at the same time, increasing the range of motion.

The combination of advanced materials technology and high precision manufacturing results in a state of the art, clinically established solution for a wide variety of patient indications.

Metasul LDH large diameter head

A proven solution with low wear and improved joint stability

Metasul technology is a proven solution that addresses the issue of polyethylene wear.[1]

Patient function is improved by:

- joint restoration that is closer to its natural anatomy
- maximized range of motion
- reduced potential for post operative dislocation

The *Metasul LDH* components can be combined with a wide range of Zimmer hip stems.

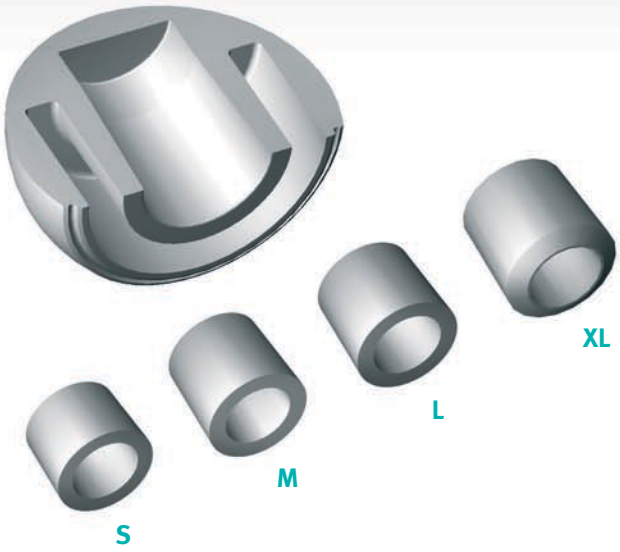
Its combined features help to restore the patient's true anatomy while offering exceptional range of motion, increased stability, and decreased wear.

A *Metasul LDH* large diameter head, used in conjunction with the *Durom*® Acetabular Component is designed to be a solution for active patients*.

* Please refer to the package insert for important patient counseling information.

Metasul LDH Technology: Differences that count

The *Metasul* bearing has been the target of continuous research and development, with clinical results since 1988. This technology is not only the basis for the modular large diameter heads – *Metasul LDH* components– but is also an industrial benchmark for combinations with low metal-on-metal wear. The size range includes 12 diameters from 38 to 60mm with neck length adaptors from –4 to +8mm.



Range of sizes

Taper	Length of neck (mm)			
	S	M	L	XL
12/14	–4	0	+4	+8

Lubrication and wear

The most effective way to minimize wear on a metal-on-metal joint is to improve its lubrication[2,3]. A suitable lubricant film thickness allows for stable and dynamic joint lubrication, thereby minimizing the amount of wear. Lubrication is dependent on minimum surface roughness, joint clearance and articulation diameter.

A high-carbon and wear-resistant CoCr alloy

The *Metasul LDH* pair (head and shell) is manufactured from *Protasul*® 21 WF, a forged chromium-cobalt-molybdenum alloy with high carbon content (0.20 –0.25% C). Chromium-cobalt alloys with high carbon content provide increased hardness due to the presence of carbides. The carbides are at least 8 times smaller than those present in cast chromium-cobalt combinations. Surface roughness is greatly reduced, which leads to a reduction in the rate of wear in comparison to cast chromium-cobalt alloys[4,5,6].

Cast CoCrMo alloy

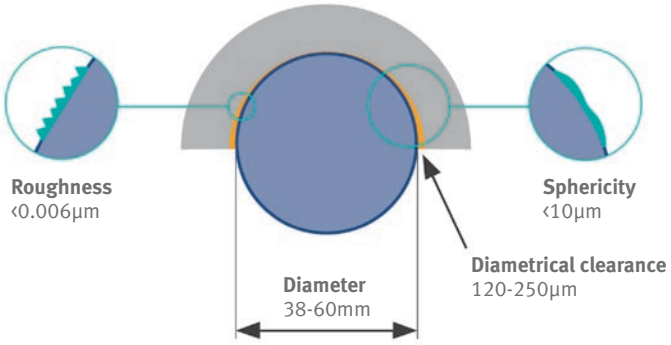
Metasul Wrought Forged CoCrMo alloy

Clearance and its limits

Clearance is one of the factors that influences wear. The diametrical clearance is the difference in articulation diameter between acetabular cup and the femoral head. The differences in diameter between the two friction surfaces have been optimized to ensure ideal tribological behavior with manufacturing tolerances of several microns.

Manufacturing precision is essential for providing increased congruence in order to avoid clamping or polar contact. The high level of sphericity (deviation with regard to a theoretically perfect sphere) leads to a constant clearance for the entire surface, thereby increasing contact surface and lowering surface stress.

Parameters determining resistance to wear



Rigorous quality control

Each *Metasul LDH* component is subjected to a dimensional and visual check that provides optimal function.

Stability and Range of Motion

Large diameter heads increase stability

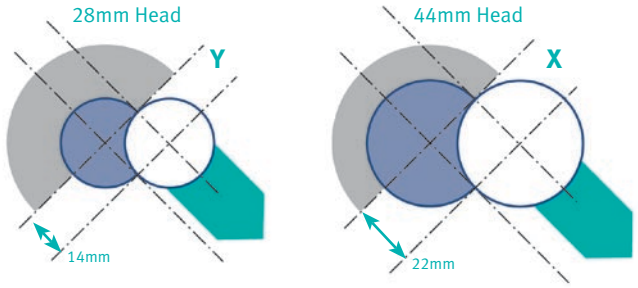
Currently, dislocation is a recurring problem in total hip arthroplasties. Further in-hospital treatment is required, which increases costs and has a negative effect on patients. Surgery is often necessary for recurring dislocations.

Recent clinical studies show that large diameter heads reduce the rate of dislocation[7,8]. Large diameter heads increase the displacement and height distance that must be covered before dislocation occurs, e.g., a displacement of 14mm is necessary to dislocate a 28mm head outside of the cup, versus 22mm for a 44mm femoral head. Prosthetic impingement is reduced by the increased range of motion of these large diameter heads.

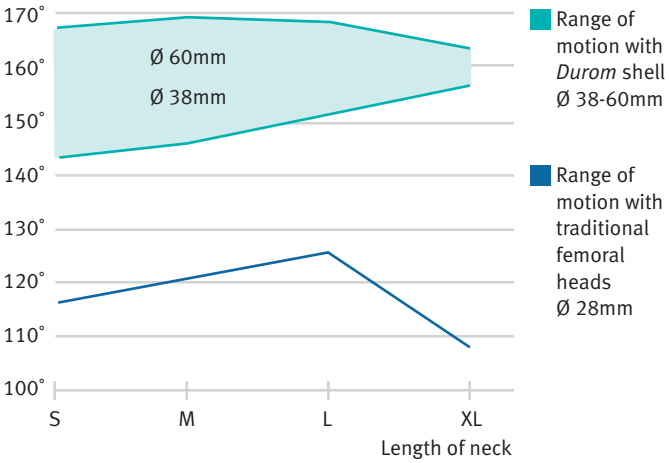
The combination of a *Metasul LDH* large diameter head and a *Durom* acetabular component makes it possible to increase the maximum range of motion without sacrificing prosthesis stability. The theoretical range of motion for a *Metasul LDH* head and *Durom* shell ranges from 144˚ to 168˚.

Dislocation Distance (X>Y)

Large diameter heads increase the distance the head must displace before dislocation (X>Y)



Range of Motion



Range of motion measured with a Durom *acetabular component*

Flexion/Extension

Head diameter	Adapter S (-4mm)	M (0mm)	L (+4mm)	XL (+8mm)
Ø 38	144	147	151	154
Ø 40	146	149	152	155
Ø 42	151	150	154	157
Ø 44	157	152	155	158
Ø 46	160	153	155	158
Ø 48	162	154	156	159
Ø 50	163	159	157	160
Ø 52	164	163	158	160
Ø 54	164	165	159	161
Ø 56	165	167	161	162
Ø 58	166	167	164	162
Ø 60	166	168	167	163

Minimum thickness, maximum stability

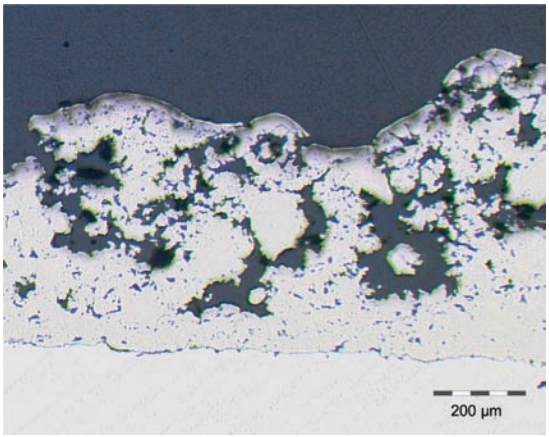
Like the anatomical acetabulum, the *Durom* acetabular cup is smaller than a hemisphere, offering increased range of motion and greater preservation of host bone stock.

Implant wall thickness is 4mm for all sizes, which allows a much greater quantity of bone to be preserved while still ensuring optimal resistance to implant clamping or deformation.

Durom acetabular component

Porolock™ Ti VPS, a pure titanium coating, is applied to the exterior surface with the aid of sophisticated vacuum plasma spray technology.

Porolock Ti VPS is a plasma spray coating with a high surface roughness that allows a good initial scratch fit against host bone. The equatorial fins, increased surface roughness of the *Porolock* Ti VPS surface and initial 2mm press-fit allow excellent initial implant stability.



Porolock Ti Vacuum Plasma Spray

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4 Wang A, et al: Surface characterization of metal-on-metal hip implants tested in a hip simulator. Wear 225-229, 1999, 708-715.
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Please refer to package insert for complete product information, including contraindications, warnings, precautions, and adverse effects.

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