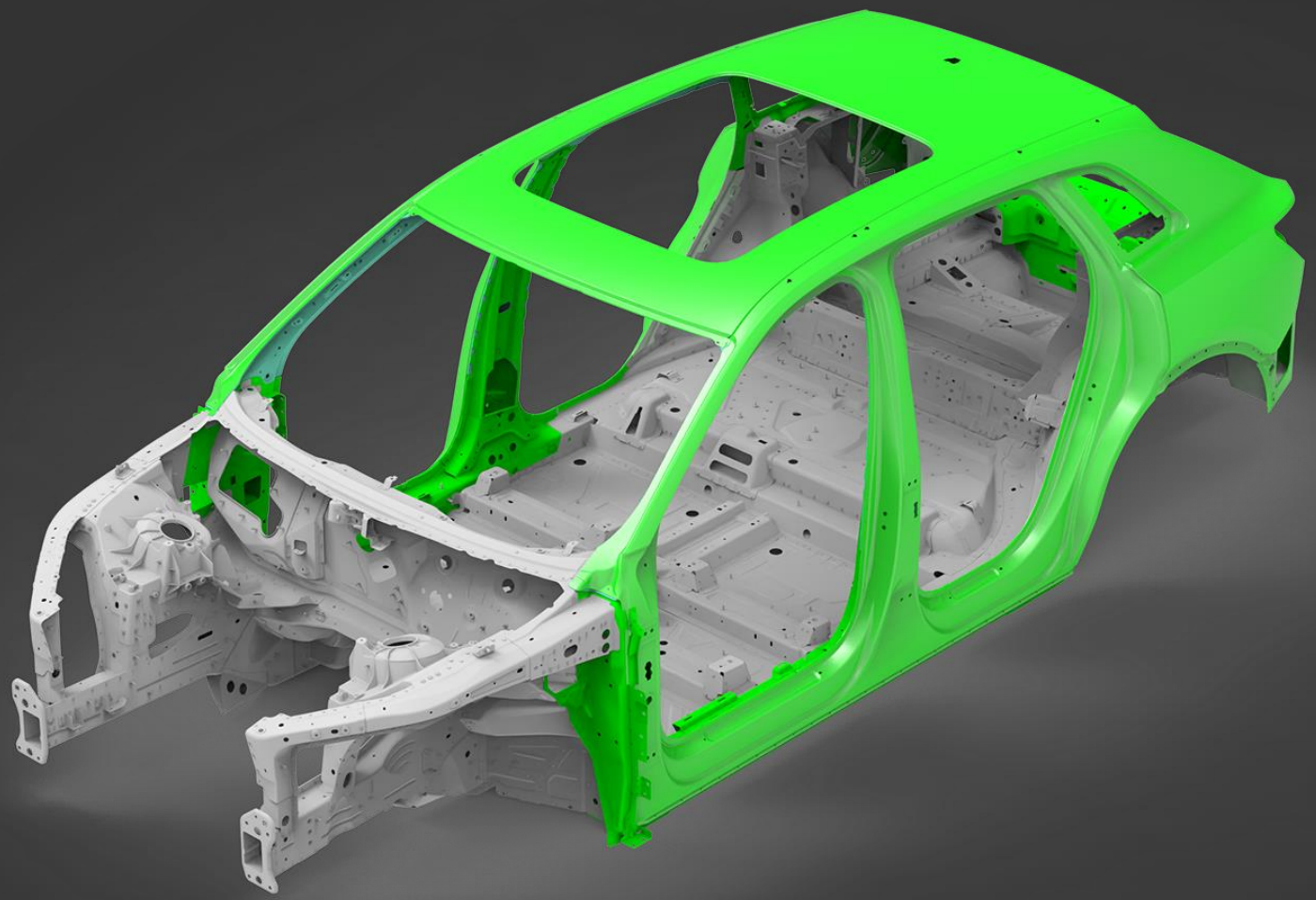
Why a Top Hat in Aluminium

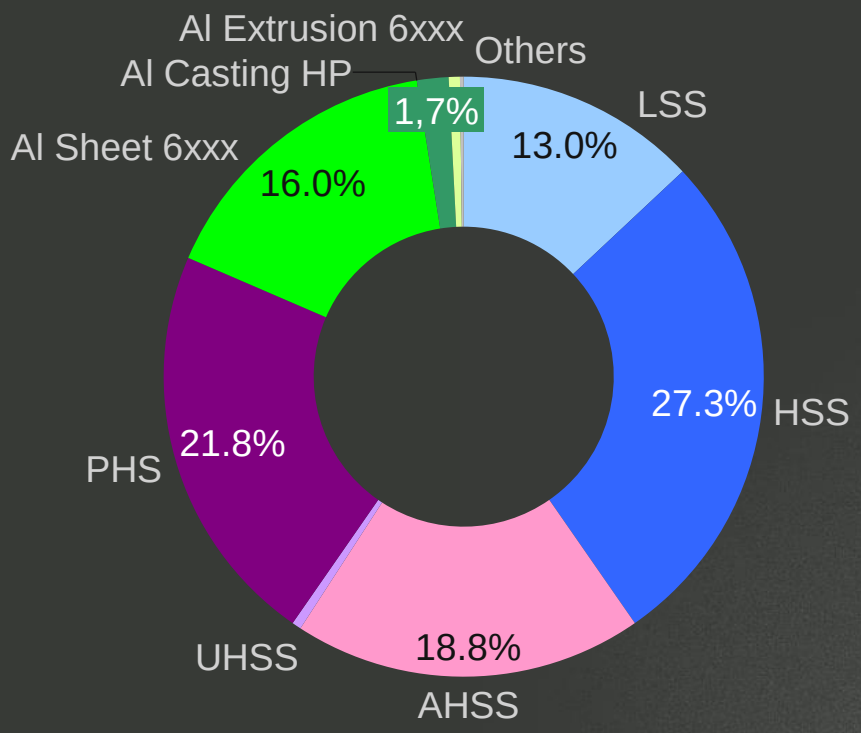
Demonstrate the weight saving associated with an all-aluminium Top Hat versus a steel reference

Replace production steel Top Hat:

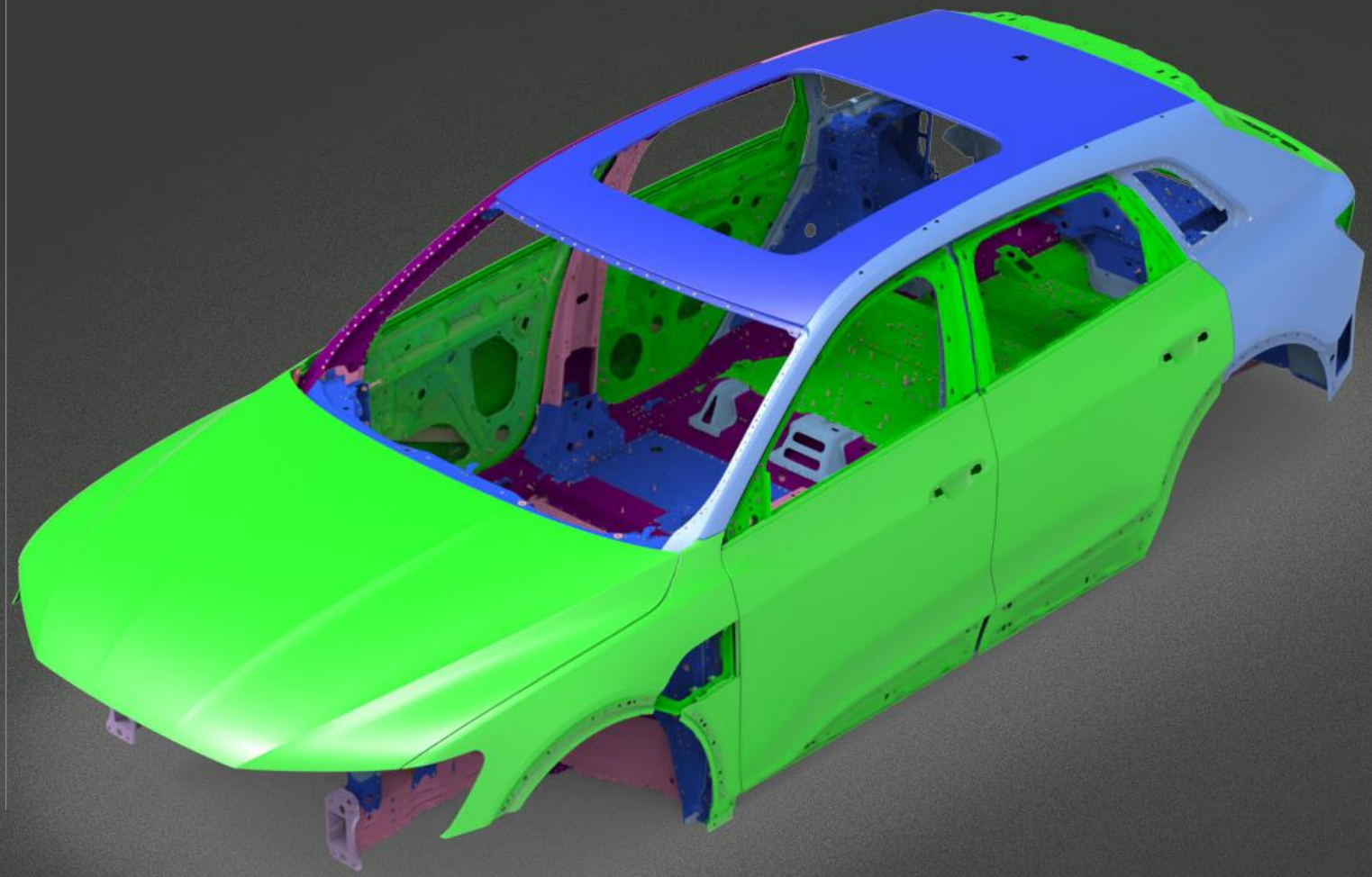
- Meet or exceed steel performance
- Maximise weight saving potential
- Utilise a range of aluminium alloys
- Demonstrate stamping feasibility
- Utilise latest forming technology
- Optimise joining technology
- Maximise aluminium part efficiency



Material Breakdown Steel Reference Body Complete

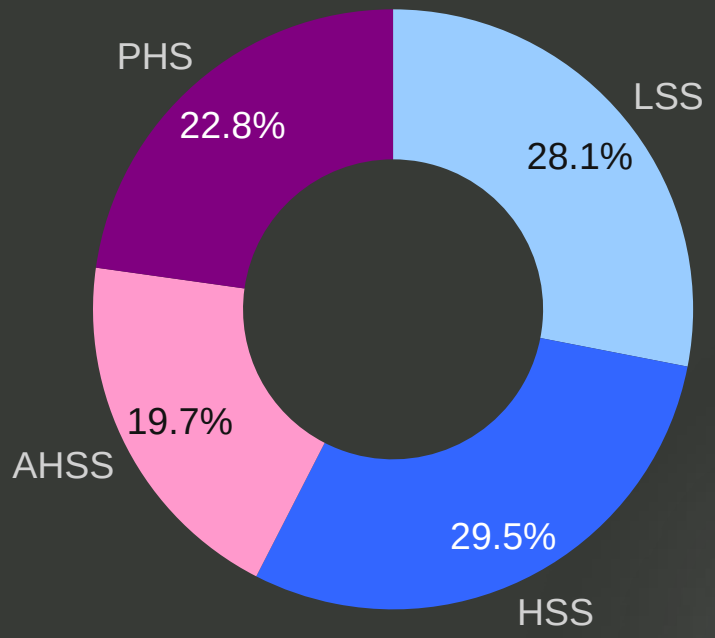


Steel BIW incl.
Doors and Closures
481,0 kg*

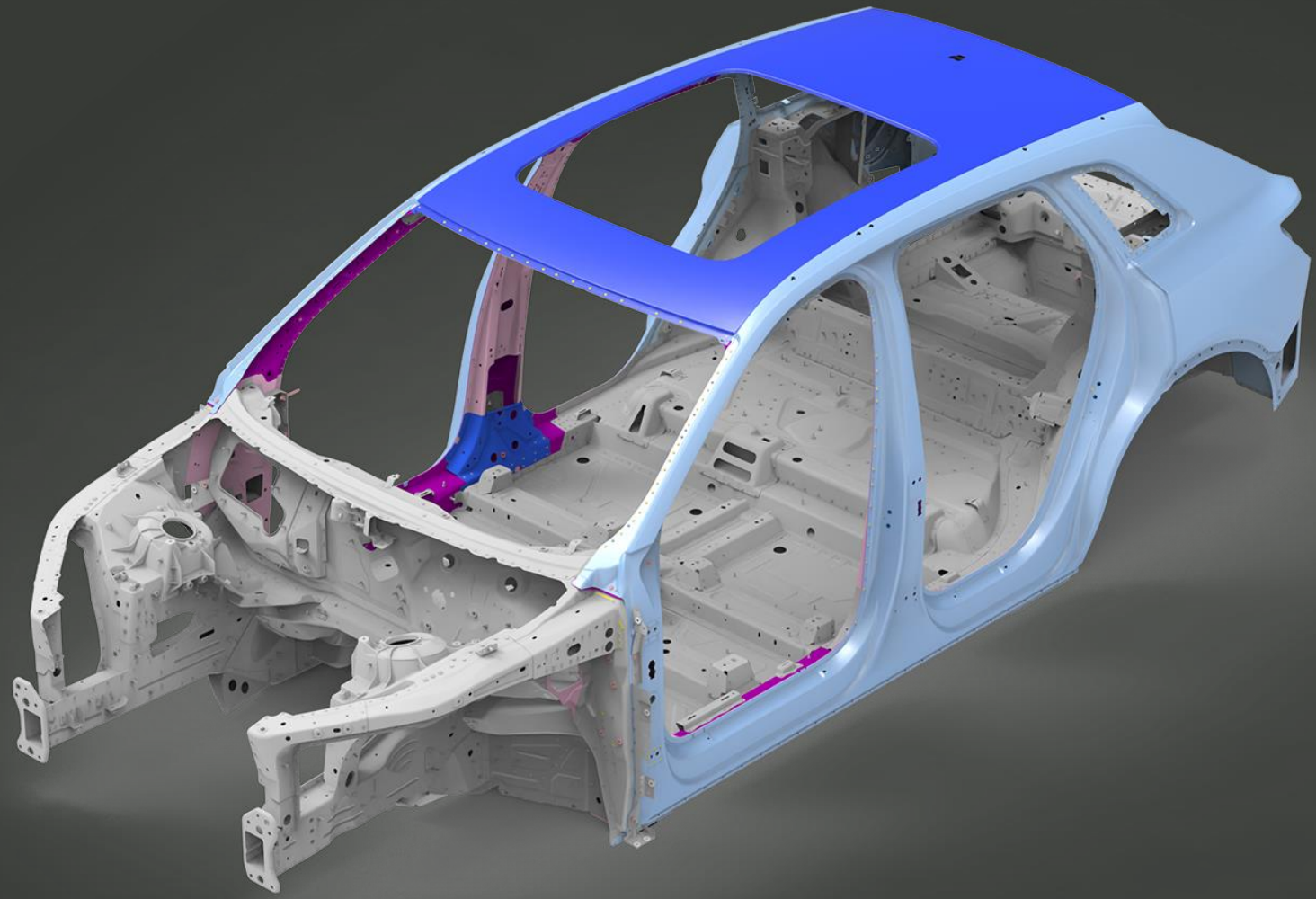


*Approximation

Material Breakdown of Steel Reference Top Hat

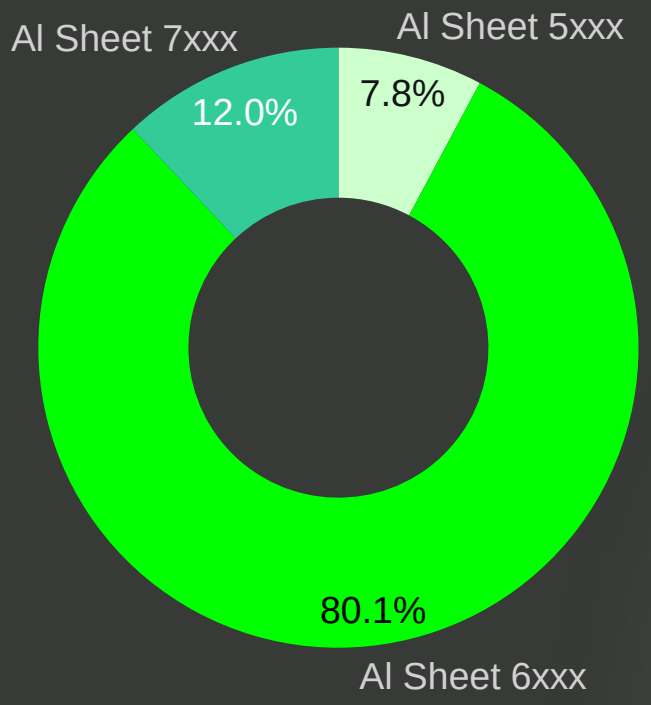


Steel Top Hat:
193,8 kg*

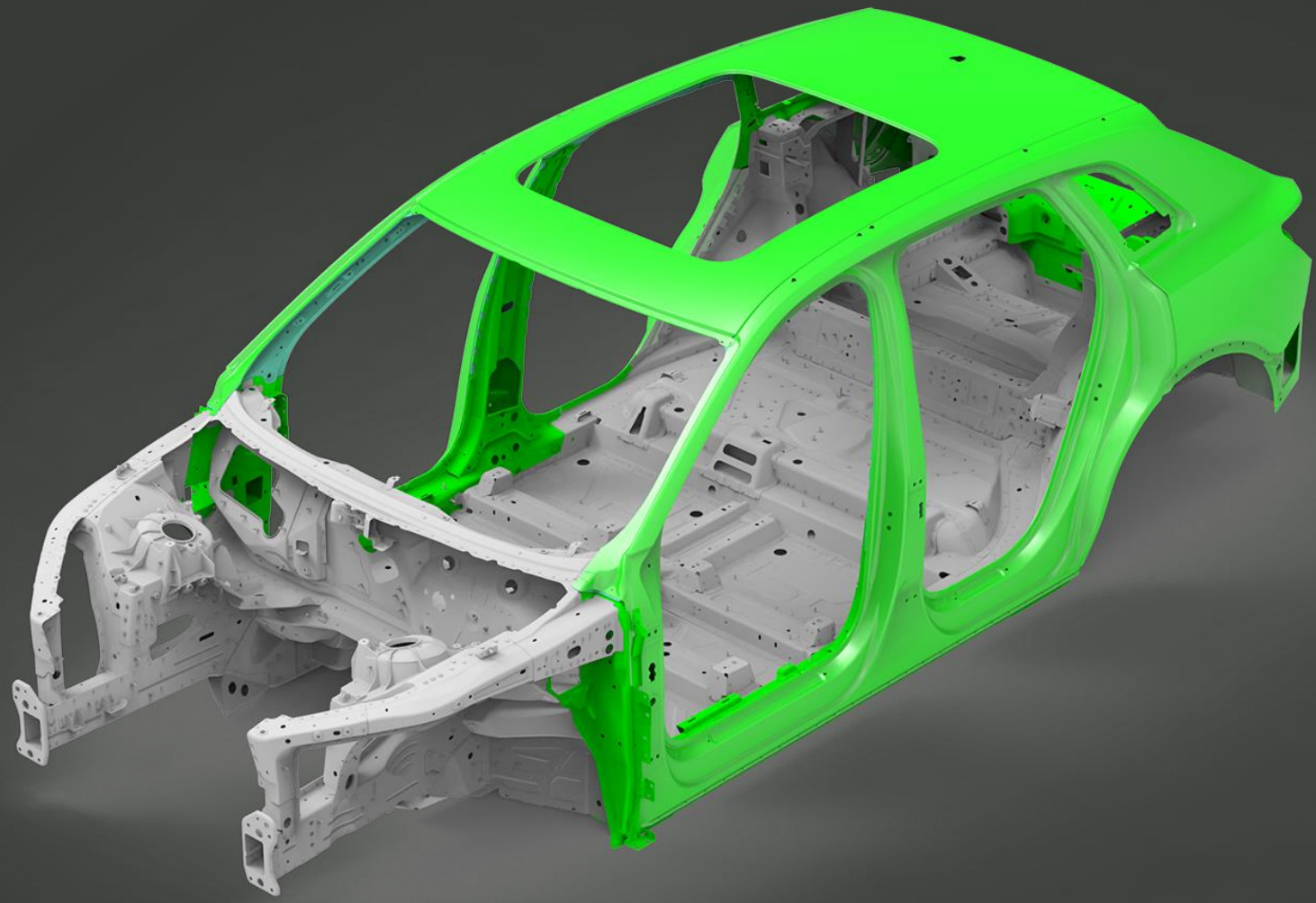


*Approximation

Material Breakdown of Aluminium Top Hat

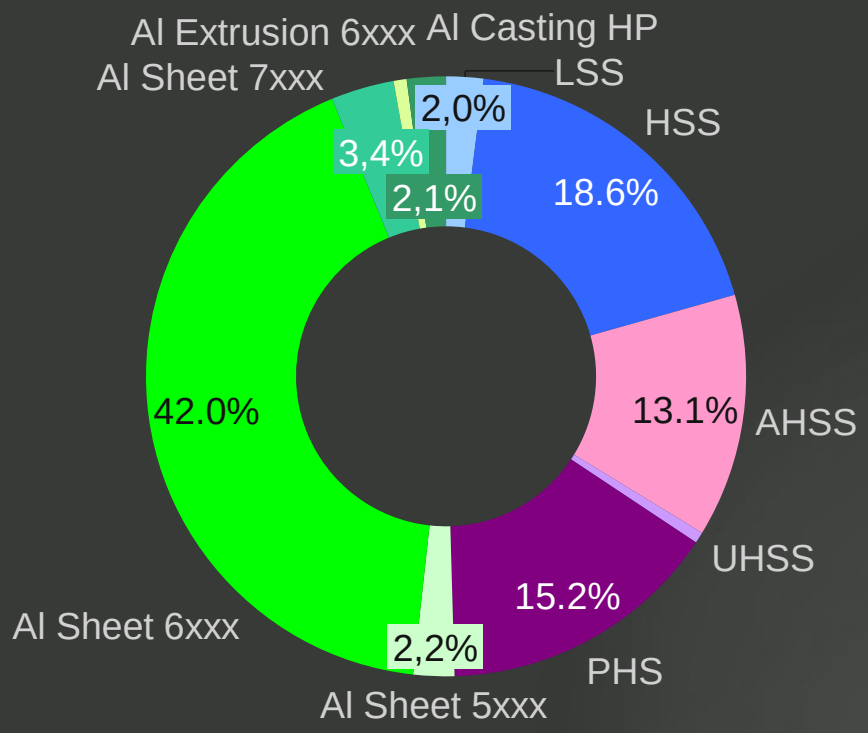


Aluminium Top Hat:
113,2 kg*

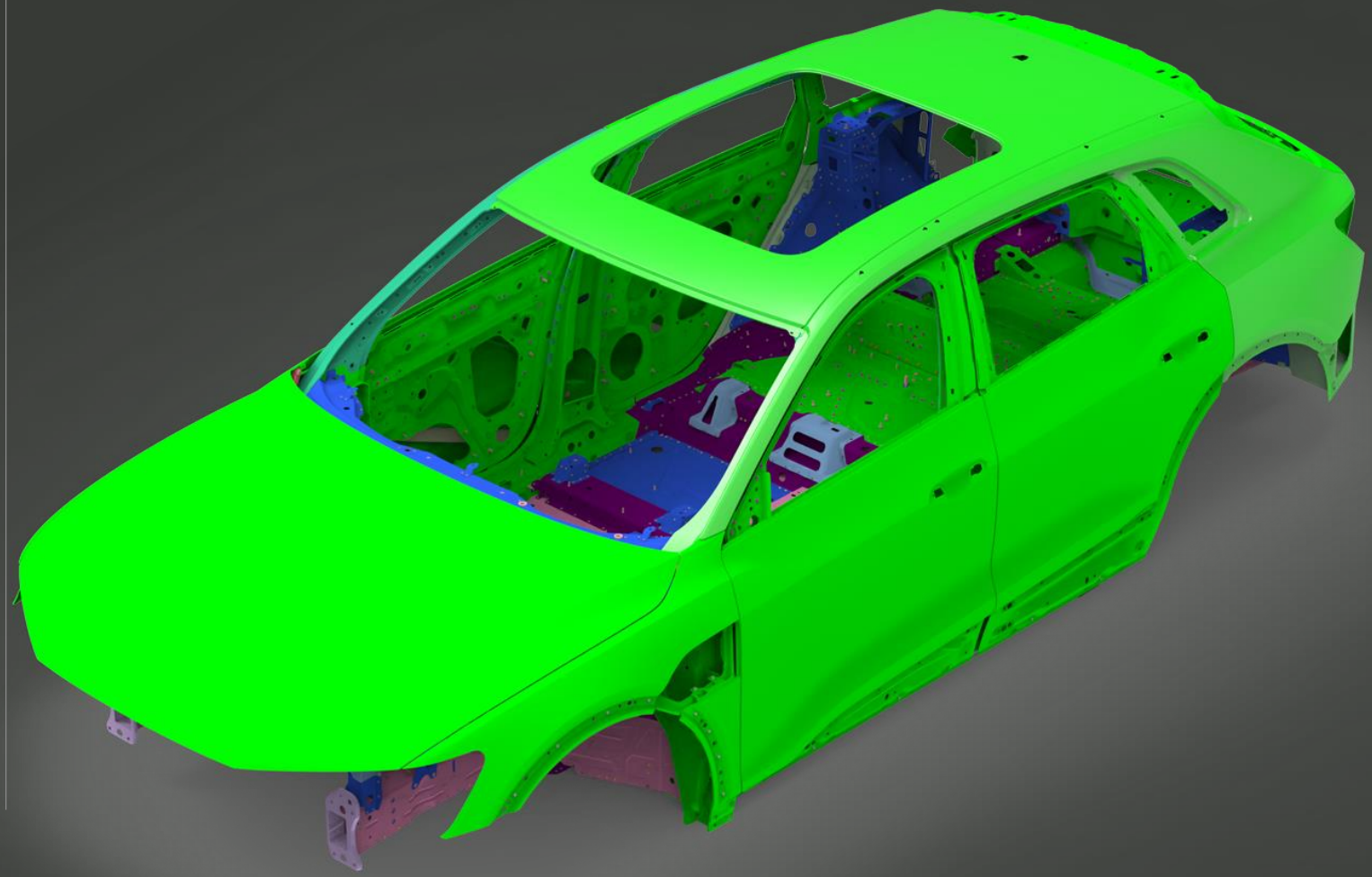


*Approximation

Material Breakdown Aluminium Top Hat with Closures

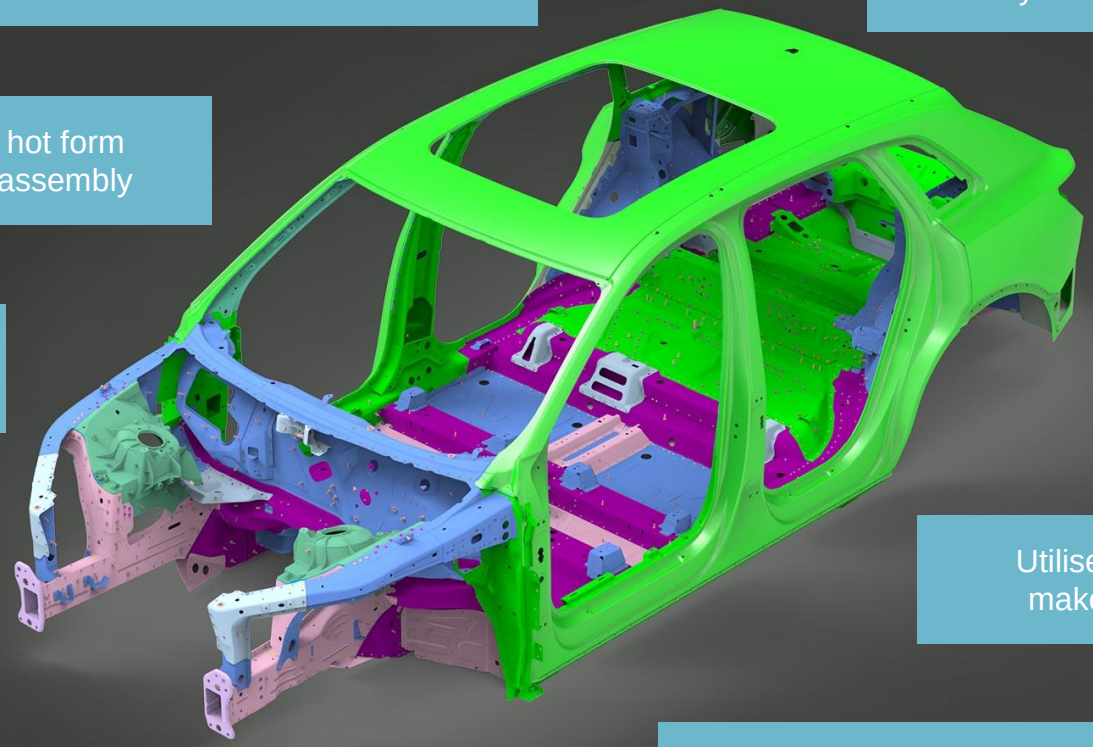


Aluminium Top Hat & steel platform & doors and closures:
399,0 kg*



*Approximation

Aluminium Top Hat Highlight Overview



Aluminium-intensive roof design with integrated roof module mountings

Feasible aluminium bodyside outer panel

High-strength hot form A-pillar upper assembly

High-strength TWB B-pillar assembly

Optimise joining technology

Gauge & material optimised wheel arch outer

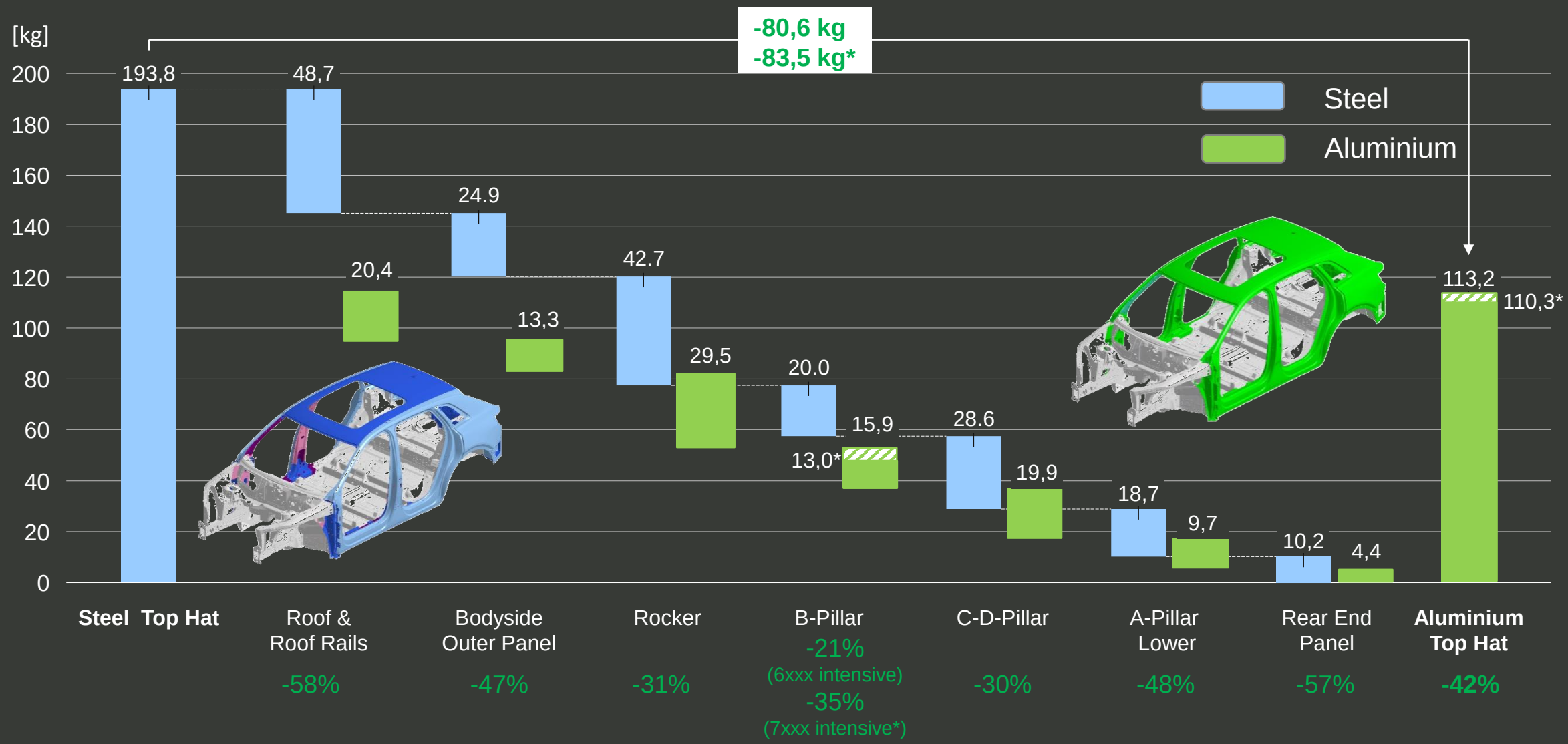
Reduced panel count vs. steel

Utilise blank scrap to make smaller parts

4 mm SPR for steel equivalent flanges

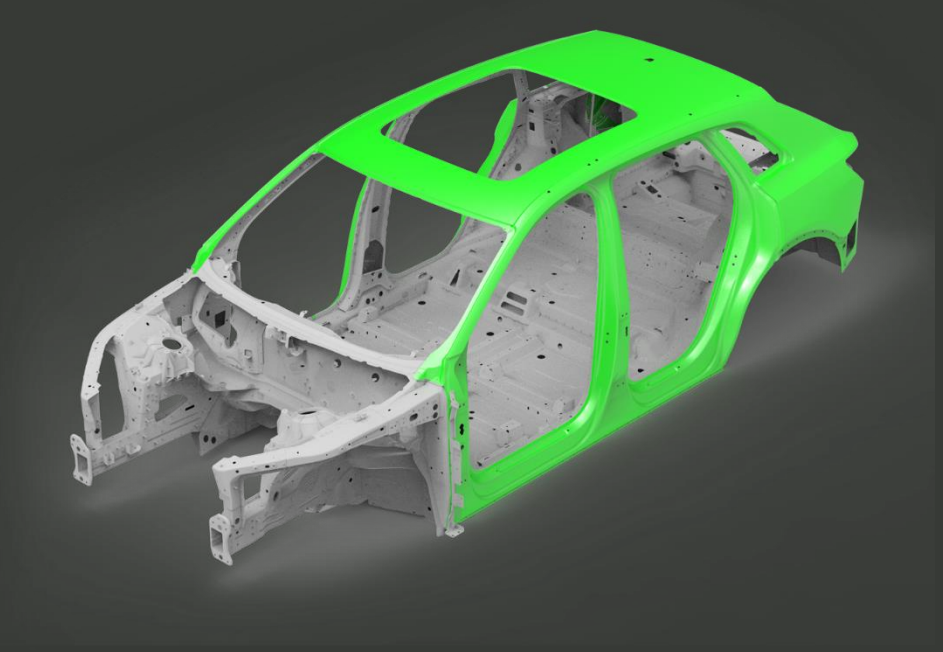
Roll form rocker assembly

Top Hat - Weight Breakdown



BIW Metrics Summary

- ✓ 42% overall weight saving achieved
- ✓ Attributes met or exceeded for load cases
- ✓ Obscuration & entry/egress maintained
- ✓ Total number of parts & joints reduced
- ✓ HS 6xxx & 7xxx alloys replaced AHSS & UHSS



Top Hat Key Metrics	Steel Part Count	Steel Part Weight	Steel Joint Count	Al Part Count	Al Part Weight	Al Joint Count
Roof & Roof Rail & A-Pillar Upper Assy	24	48,7 kg		18	20,4 kg	
Body Side Outer	4	24,9 kg		8	13,3 kg	
A-Pillar Lower Assy	20	18,7 kg		20	9,7 kg	
B-Pillar Assy	15	20,0 kg		17	15,9 kg	
C/D-Pillar Assy	42	28,6 kg		42	19,9 kg	
Rocker Assy	24	42,7 kg		20	29,5 kg	
Lower Back Assy	8	10,2 kg		8	4,4 kg	
Total	137	193,8 kg	3217	133	113,2 kg	2556
% change vs steel reference					- 41,6%	- 21%

