

Gas Injection Revolution

IG1 APACHE



IG3 HORIZON



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Computational Fluid Dynamics

Computational Fluid Dynamics

Abstract from Wikipedia, the free encyclopedia

Computational Fluid Dynamics (CFD) is one of the branches of [fluid mechanics](#) that uses [numerical methods](#) and algorithms to solve and analyze problems that involve fluid flows. Computers are used to perform the millions of calculations required to simulate the interaction of fluids and gases with the complex surfaces used in engineering

Outflow coefficient

The (out)flow coefficient of a device is a relative measure of its efficiency at allowing [fluid](#) flow. It describes the relationship between the [pressure drop](#) across an [orifice](#) (i.e. injector seat) and the corresponding [flow rate](#).

Coefficient of flow (or discharge) is ratio between the actual flow rate to Theoretical discharge.

In mathematical terms, the *outflow coefficient* C_v is the volume (F) of fluid at 300 K that will flow per second through a valve with a pressure drop (ΔP) of 0.1 bar across the valve.

Numerically this definition can be expressed as:

$$C_v = F \sqrt{\frac{SG}{\Delta P}}$$

The use of the flow coefficient offers a standard method of comparing valve efficiency. The general definition of the flow coefficient can be expanded into equations modeling the flow of liquids, gases and steam as follows:

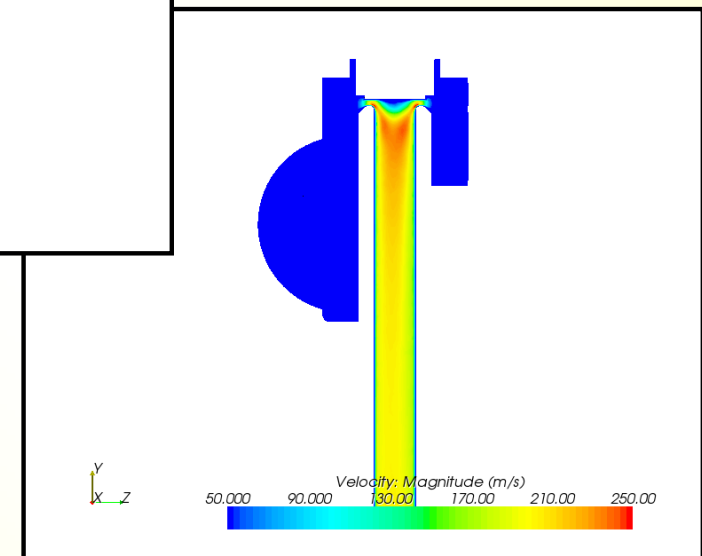
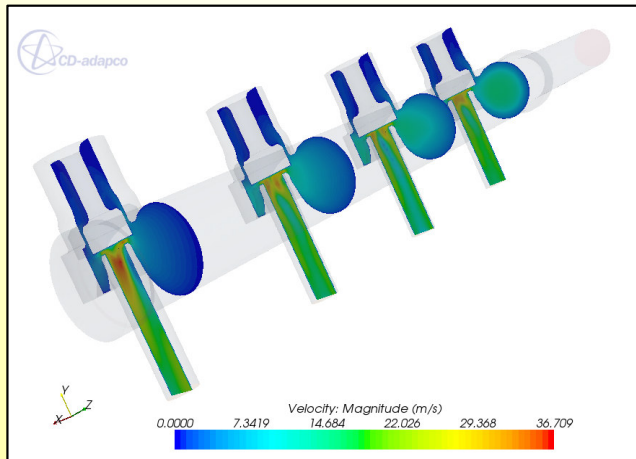
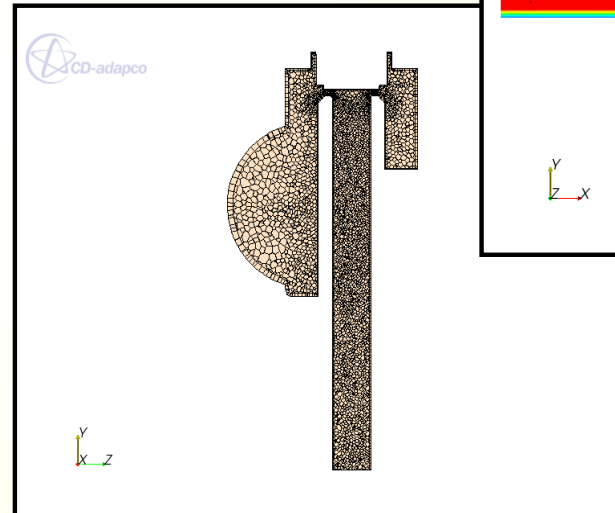
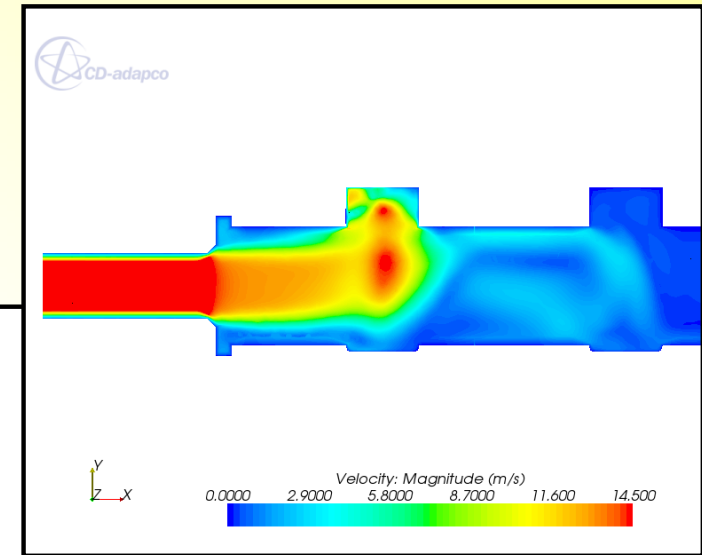
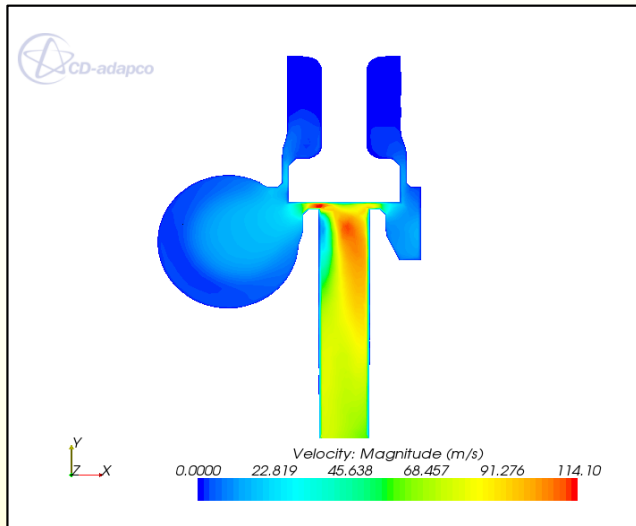
$$C = \frac{\dot{m}_a}{\dot{m}_{id}} = \frac{\dot{m}_a}{\frac{\pi d^2}{4} \rho_{01} a_{01} \phi_f (p_2 / p_{01})}$$



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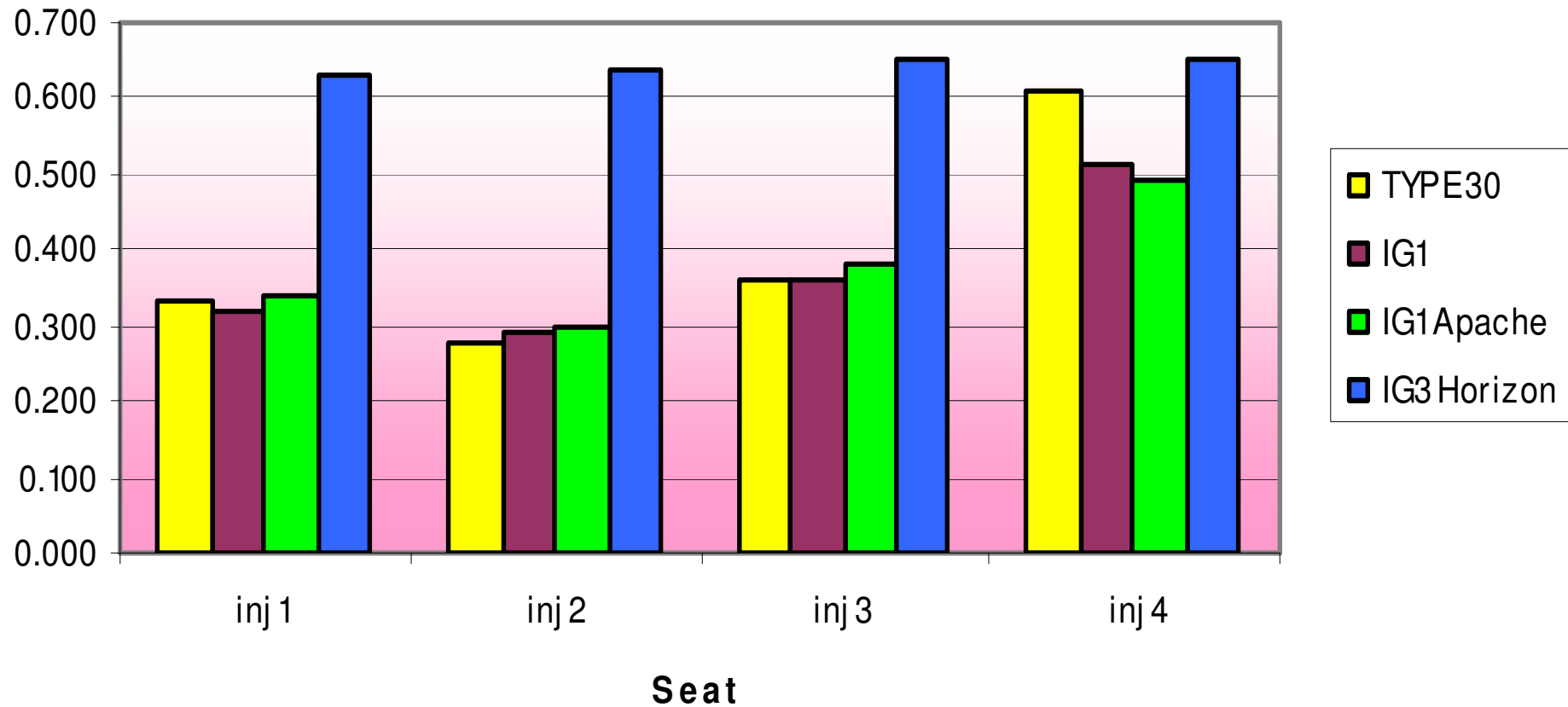
CFD Analysis



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OUTFLOW COEFFICIENT

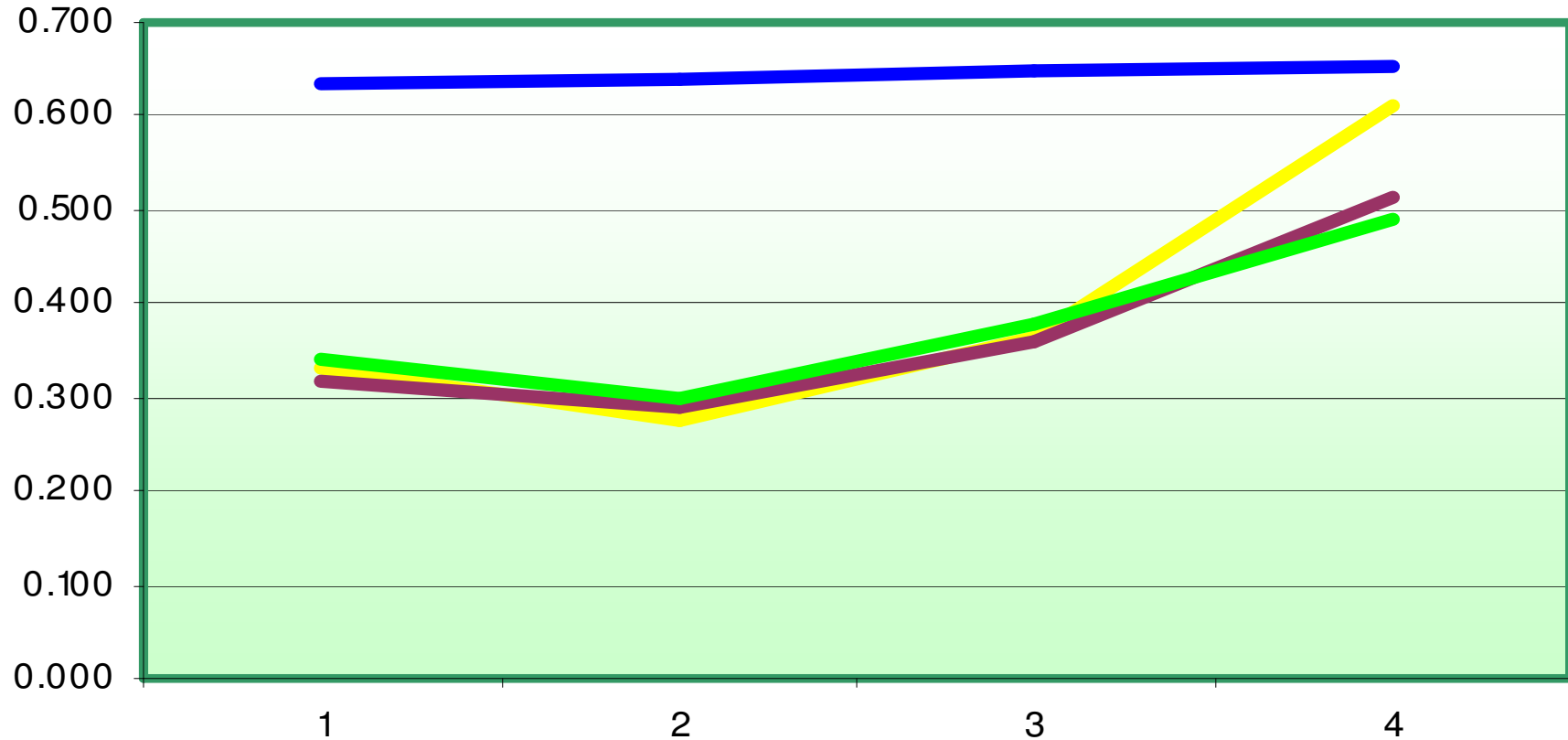


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4 Seats flow efficiency

TYPE 30 IG1 IG1 Apache IG3 Horizon

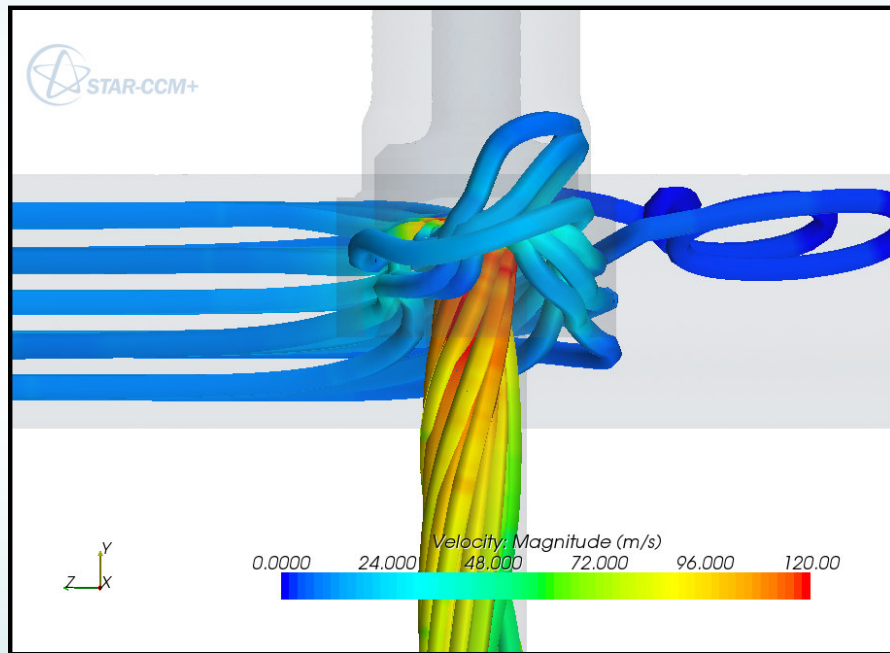


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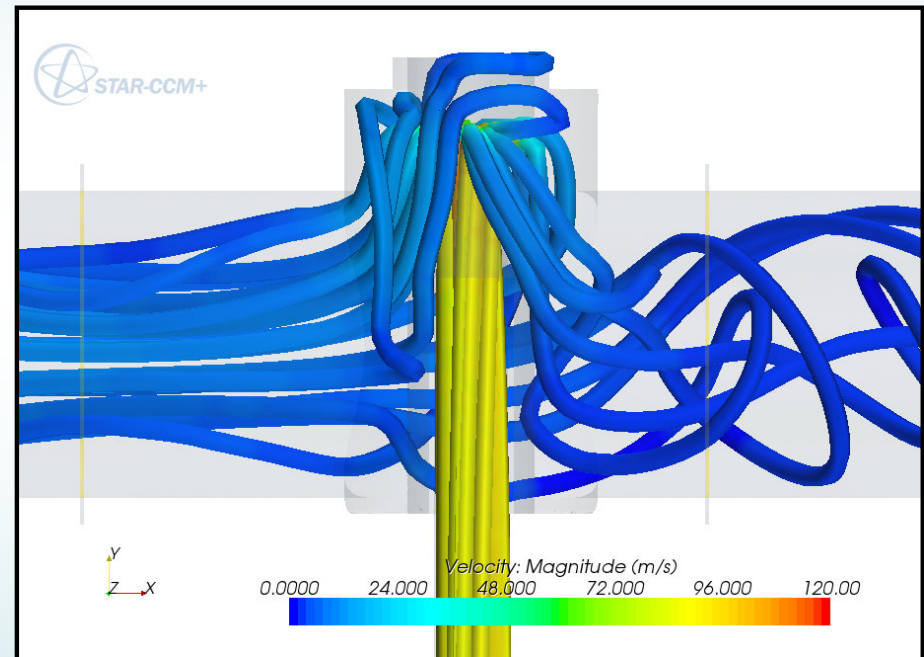


Streamline analysis

Rail IG1

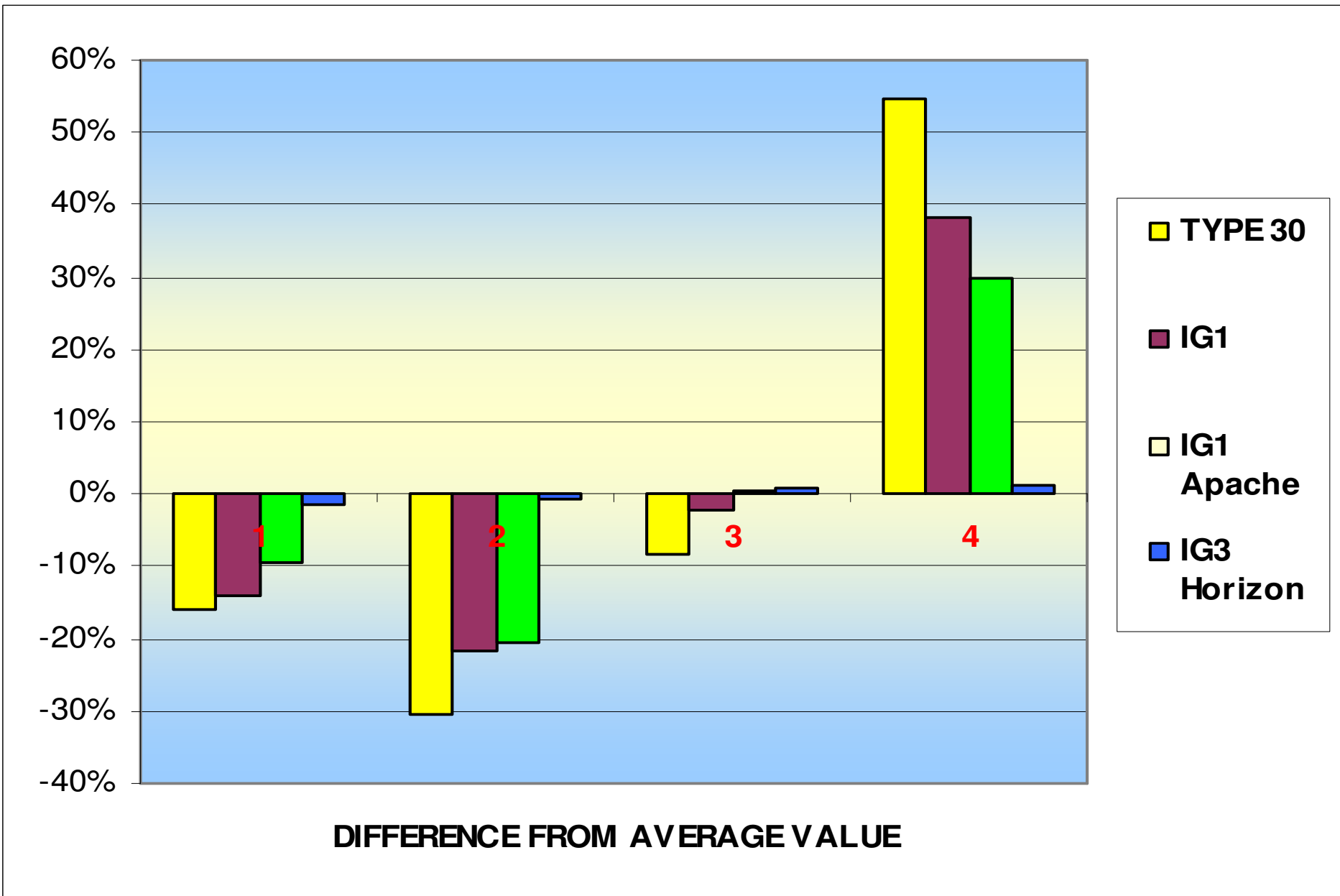


Rail IG3 Horizon



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