

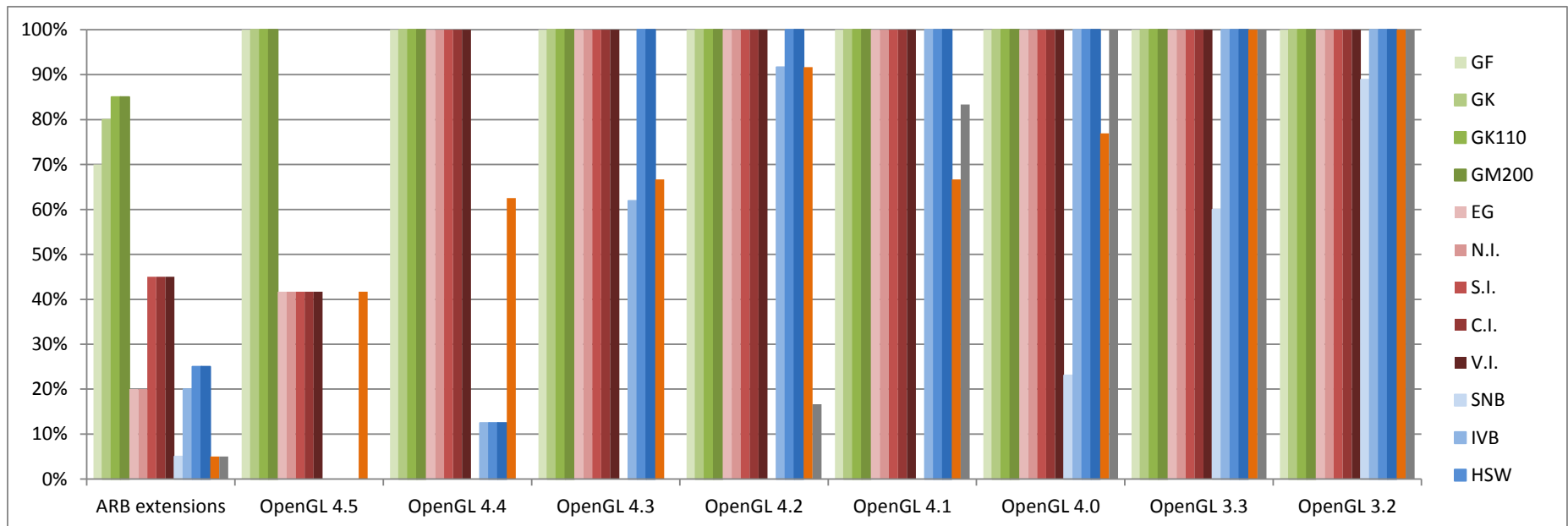
OpenGL hardware matrix

Extensions exposed by OpenGL implementations

June 2015, G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series
GK / Kepler: GeForce 600 series, GeForce 700 series
GK110 / Kepler 110: GeForce 780
GM200 / Maxwell: GeForce 900 series
EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series
N.I. / Northern Islands: Radeon HD 6900 series
S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280
C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270
V.I. / Volcanic Islands: Radeon R9 285 / 290 / Fury
SNB / Sandy Bridge: HD, HD 2000
IVB / Ivy Bridge: HD4000, HD2500
HSW / Haswell: Iris 5X00 series, HD 4X00 series
BSW / Broadwell: Iris 6X00 series, HD 5X00 series

Vendor	NVIDIA					AMD					Intel				Mesa	Apple
Drivers version	347.09					14.12					4101	3958	3977	4124	git	10.10.1
Release date	18/12/2014					12/09/2014					26/10/2014				04/01/2015	17/11/2014
Platforms	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X	
ARB extensions	70%	80%	85%	85%	20%	20%	45%	45%	45%	5%	20%	25%	25%		5%	5%
OpenGL 4.5	100%	100%	100%	100%	42%	42%	42%	42%	42%	0%	0%	0%	0%		42%	0%
OpenGL 4.4	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	13%	13%	13%		63%	0%
OpenGL 4.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	62%	100%	100%		67%	0%
OpenGL 4.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	92%	100%	100%		92%	17%
OpenGL 4.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%		67%	83%
OpenGL 4.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	23%	100%	100%	100%		77%	100%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	60%	100%	100%	100%		100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	89%	100%	100%	100%		100%	100%



Nomenclature:

Supported
Not supported
Support added from previous report

OpenGL Extensions	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
<u>KHR_blend_equation_advanced_coherent</u>	X	X	V	V	X	X	X	X	X	X	X	X	X	X	X
<u>KHR_blend_equation_advanced</u>	V	V	V	V	X	X	X	X	X	X	X	V	V	X	X
<u>KHR_texture_compression_astc_ldr</u>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<u>ARB_transform_feedback_overflow_query</u>	V	V	V	V	X	X	X	X	X	X	V	V	V	X	X
<u>ARB_robustness</u>	V	V	V	V	X	X	X	X	X	X	V	V	V	X	X
<u>ARB_sparse_texture</u>	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
<u>ARB_sparse_buffer</u>	V	V	V	V	X	X	V	V	V	X	X	X	X	X	X
<u>ARB_shading_language_include</u>	V	V	V	V	X	X	X	X	X	X	X	X	X	X	V
<u>ARB_shader_stencil_export</u>	X	X	X	X	V	V	V	V	V	X	X	X	X	X	X
<u>ARB_shader_group_vote</u>	V	V	V	V	X	X	V	V	V	X	X	X	X	X	X
<u>ARB_shader_draw_parameters</u>	V	V	V	V	X	X	V	V	V	X	X	X	X	X	X
<u>ARB_seamless_cubemap_per_texture</u>	X	V	V	V	V	V	V	V	V	X	X	X	X	X	X
<u>ARB_robustness_isolation</u>	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
<u>ARB_pipeline_statistics_query</u>	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
<u>ARB_debug_output</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB_indirect_parameters</u>	V	V	V	V	X	X	V	V	V	X	X	X	X	X	X
<u>ARB_compute_variable_group_size</u>	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
<u>ARB_compatibility</u>	V	V	V	V	V	V	V	V	V	V	V	V	V	X	X
<u>ARB_cl_event</u>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<u>ARB_bindless_texture</u>	X	V	V	V	X	X	V	V	V	X	X	X	X	X	X
Support	72%	83%	83%	83%	22%	22%	50%	50%	50%	6%	22%	22%	22%		6%

OpenGL Extensions	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
<u>EXT_texture_compression_dxt1</u>	V	V	V	V	X	X	X	X	X	X	X	X	X	V	V
<u>EXT_texture_compression_s3tc</u>	V	V	V	V	V	V	V	V	V	V	V	V	V	X	V
<u>EXT_texture_sRGB_decode</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>EXT_texture_mirror_clamp</u>	V	V	V	V	V	V	V	V	V	X	X	X	X	X	V

NV fill rectangle	X	X	X	V	X	X	X	X	X	X	X	X	X	X	X
NV explicit multisample	V	V	V	V	V	V	V	V	V	X	X	X	X	X	X
NV depth buffer float	V	V	V	V	V	V	V	V	V	X	X	X	X	X	X
NV copy image	V	V	V	V	V	V	V	V	V	X	X	X	X	X	X
NV conservative raster	X	X	X	V	X	X	X	X	X	X	X	X	X	X	X
NV bindless texture	X	V	V	V	X	X	X	X	X	X	X	X	X	X	X
NV bindless multi draw indirect count	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
NV bindless multi draw indirect	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
NV blend equation advanced	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
INTEL map texture	X	X	X	X	X	X	X	X	X	V	V	V	V	X	X
INTEL fragment shader ordering	X	X	X	X	X	X	V	V	V	X	X	V	V	X	X
INTEL conservative rasterization	X	X	X	X	X	X	X	X	X	X	X	V	V	X	X
ANGLE texture compression dxt5	X	X	X	X	X	X	X	X	X	X	X	X	X	V	X
ANGLE texture compression dxt3	X	X	X	X	X	X	X	X	X	X	X	X	X	V	X
AMD vertex shader viewport index	X	X	X	X	V	V	V	V	V	X	X	V	V	X	X
AMD vertex shader layer	X	X	X	X	V	V	V	V	V	X	X	V	V	V	X
AMD transform feedback4	X	X	X	X	X	X	V	V	V	X	X	X	X	X	X
AMD transform feedback3 lines triangles	X	X	X	X	X	V	V	V	V	X	X	X	X	X	X
AMD stencil operation extended	X	X	X	X	X	X	V	V	V	X	X	X	X	X	X
AMD_sparse_texture_pool	X	X	X	X	X	X	X	V	V	X	X	X	X	X	X
AMD sparse texture	X	X	X	X	X	X	V	V	V	X	X	X	X	X	X
AMD shader trinary minmax	X	X	X	X	X	X	V	V	V	X	X	X	X	V	X
AMD shader stencil value export	X	X	X	X	X	X	V	V	V	X	X	X	X	X	X
AMD shader stencil export	X	X	X	X	V	V	V	V	V	X	X	X	X	X	X
AMD seamless cubemap per texture	X	V	V	V	V	V	V	V	V	X	X	X	X	V	X
AMD sample positions	X	X	X	X	V	V	V	V	V	X	X	X	X	X	X
AMD query buffer object	X	X	X	X	V	V	V	V	V	X	X	X	X	X	X
AMD pinned memory	X	X	X	X	V	V	V	V	V	X	X	X	X	X	X
AMD performance monitor	X	X	X	X	V	V	V	V	V	X	X	X	X	V	X
AMD occlusion query event	X	X	X	X	X	X	X	V	V	X	X	X	X	X	X
AMD interleaved elements	X	X	X	X	X	X	V	V	V	X	X	X	X	X	X
AMD gpu shader int64	X	X	X	X	X	X	V	V	V	X	X	X	X	X	X
AMD gcn shader	X	X	X	X	X	X	V	V	V	X	X	X	X	X	X

AMD_framebuffer_sample_positions	X	X	X	X	X	X	V	V	V	X	X	X	X	X	X
AMD_blend_minmax_factor	X	X	X	X	X	V	V	V	V	X	X	X	X	X	X
ATI_texture_mirror_once	V	V	V	V	V	V	V	V	V	X	X	X	X	X	V
Support	43%	49%	50%	69%	25%	27%	45%	47%	47%	3%	9%	17%	17%	12%	10%

OpenGL 4.5	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
KHR_context_flush_control	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
KHR_robust_buffer_access_behavior	V	V	V	V	X	X	X	X	X	X	X	X	X	V	X
KHR_robustness	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
ARB_ES3_1_compatibility	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
ARB_clip_control	V	V	V	V	V	V	V	V	V	X	X	X	X	V	X
ARB_conditional_render_inverted	V	V	V	V	V	V	V	V	V	X	X	X	X	V	X
ARB_cull_distance	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
ARB_derivative_control	V	V	V	V	V	V	V	V	V	X	X	X	X	V	X
ARB_direct_state_access	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
ARB_get_texture_sub_image	V	V	V	V	V	V	V	V	V	X	X	X	X	X	X
ARB_shader_texture_image_samples	V	V	V	V	X	X	X	X	X	X	X	X	X	X	X
ARB_texture_barrier	V	V	V	V	V	V	V	V	V	X	X	X	X	V	X
Support	100%	100%	100%	100%	42%	42%	42%	42%	42%	0%	0%	0%	0%	42%	0%

OpenGL 4.4	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
ARB_buffer_storage	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
ARB_clear_texture	V	V	V	V	V	V	V	V	V	X	X	X	X	V	X
ARB_enhanced_layouts	V	V	V	V	V	V	V	V	V	X	X	X	X	X	X
ARB_multi_bind	V	V	V	V	V	V	V	V	V	X	X	X	X	V	X
ARB_query_buffer_object	V	V	V	V	V	V	V	V	V	X	X	X	X	X	X
ARB_texture_mirror_clamp_to_edge	V	V	V	V	V	V	V	V	V	X	X	X	X	V	X
ARB_texture_stencil8	V	V	V	V	V	V	V	V	V	X	X	X	X	X	X
ARB_vertex_type_10f_11f_11f_rev	V	V	V	V	V	V	V	V	V	X	X	X	X	V	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	13%	13%	13%	63%	0%

OpenGL 4.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
ARB_vertex_attrib_binding	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X

<u>ARB texture view</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	V	X
<u>ARB texture storage multisample</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB texture query levels</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	V	X
<u>ARB texture buffer range</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB stencil texturing</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB shader storage buffer object</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	X	X
<u>ARB shader image size</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	X
<u>ARB program interface query</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	X
<u>ARB multi draw indirect</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB invalidate subdata</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	V	X
<u>ARB internalformat query2</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	X
<u>ARB framebuffer no attachments</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	X
<u>ARB fragment layer viewport</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	V	X
<u>ARB explicit uniform location</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	V	X
<u>ARB ES3 compatibility</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>KHR debug</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB copy image</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB compute shader</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	X	X
<u>ARB clear buffer object</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	V	X
<u>ARB arrays of arrays</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	62%	100%	100%	67%	0%

OpenGL 4.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
<u>ARB transform feedback instanced</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB texture compression bptc</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB texture storage</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB shading language packing</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB shading language 420pack</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB shader image load store</u>	V	V	V	V	V	V	V	V	V	X	X	V	V	X	X
<u>ARB shader atomic counters</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB map buffer alignment</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB internalformat query</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB conservative depth</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X

<u>ARB compressed texture pixel storage</u>	V	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB base instance</u>	V	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	92%	100%	100%	92%	17%

OpenGL 4.1	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
<u>ARB viewport array</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB vertex attrib 64bit</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	V
<u>ARB shader precision</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	V
<u>ARB separate shader objects</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB get program binary</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	X
<u>ARB ES2 compatibility</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	67%	83%

OpenGL 4.0	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
<u>ARB transform feedback3</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB transform feedback2</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB texture query lod</u>	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
<u>ARB texture gather</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB texture cube map array</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB texture buffer object rgb32</u>	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
<u>ARB tessellation shader</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	V
<u>ARB shader subroutine</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	V
<u>ARB sample shading</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB gpu shader5</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB gpu shader fp64</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	X	V
<u>ARB draw indirect</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
<u>ARB draw buffers blend</u>	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	23%	100%	100%	100%	77%	100%

OpenGL 3.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
<u>ARB vertex type 2 10 10 10 rev</u>	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
<u>ARB timer query</u>	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
<u>ARB texture swizzle</u>	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V

ARB texture_rgb10_a2ui	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB shader_bit_encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB sampler_objects	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V	V
ARB occlusion_query2	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB instanced_arrays	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V	V
ARB explicit_attrib_location	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB blend_func_extended	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	60%	100%	100%	100%	100%	100%

OpenGL 3.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	MacOS X
ARB vertex_array_bgra	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB texture_multisample	V	V	V	V	V	V	V	V	V	X	V	V	V	V	V
ARB sync	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB seamless_cube_map	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB provoking_vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB geometry_shader4	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB fragment_coord_conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB depth_clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB draw_elements_base_vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	89%	100%	100%	100%	100%	100%