# SPEC CPU®2026 Floating Point Rate Result

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## Raspberry Pi

(Test Sponsor: Ampere Computing, Inc.)

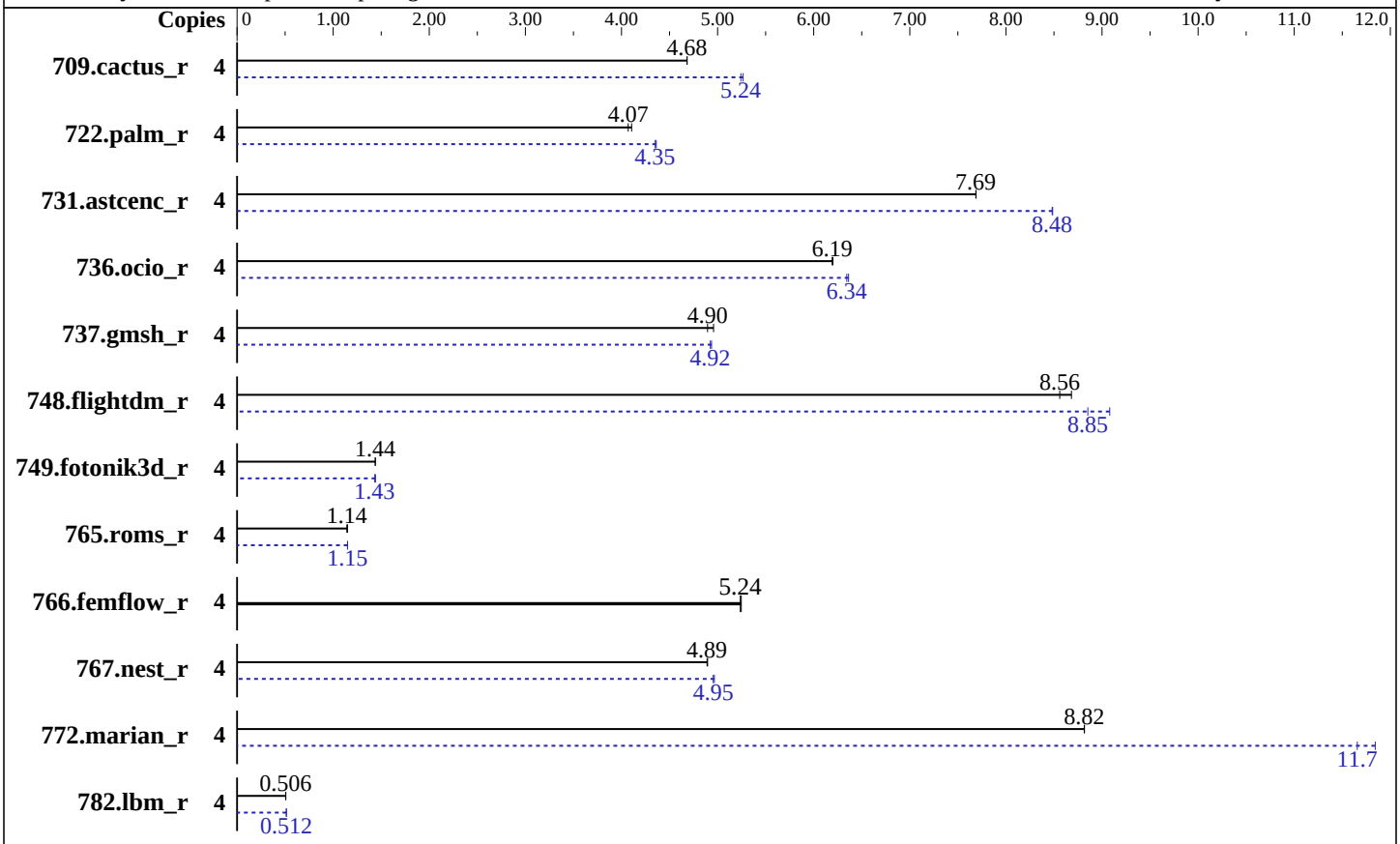
## Raspberry Pi 5 Model B Rev 1.1 (16 GB)

SPECrate®2026_fp_base = 3.72

SPECrate®2026_fp_peak = 3.93

**CPU2026 License:** 6412
**Test Sponsor:** Ampere Computing, Inc.
**Tested by:** Ampere Computing, Inc.

**Test Date:** Feb-2026
**Hardware Availability:** Jan-2025
**Software Availability:** Nov-2025




### Hardware

| | |
|---|---|
| CPU Name: | Broadcom BCM2712 |
| Max MHz: | 2400 |
| Nominal: | 2400 |
| Enabled: | 4 cores, 1 chip |
| Orderable: | 1 board |
| Cache L1: | 64 KB I + 64 KB D on chip per core |
| L2: | 2 MB I+D on chip per core 512 KB |
| L3: | 2 MB I+D on chip per chip |
| Other: | None |
| Memory: | 16 GB |
| Storage: | 1 x 128 GB Samsung PRO Endurance MicroSD |
| Cooling: | Air |
| Other: | Adafruit Raspberry Pi 5 case (ID 6307; no fan); veakson Portable Desk Fan (UPC 669936718801) |

### Software

| | |
|---|---|
| OS: | DietPi v9.19.2 (kernel 6.12.47+rpt-rpi-2712) |
| Compiler: | C/C++/Fortran: Version 14.2.0 of GCC, the GNU Compiler Collection (Debian 14.2.0-19) |
| Compiler Category: | Community |
| Firmware: | Version 57db150d released Nov-2025 |
| File System: | ext4 |
| System State: | Run level 3 (multi-user; no GUI) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Other: | None |
| Power Management: | All settings left at default. |

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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 709.cactus_r | 4 | 733 | 4.68 | **733** | **4.68** | | | 4 | 652 | 5.27 | **655** | **5.24** | | |
| 722.palm_r | 4 | **1297** | **4.07** | 1286 | 4.11 | | | 4 | 1211 | 4.36 | **1214** | **4.35** | | |
| 731.astcenc_r | 4 | 437 | 7.69 | **437** | **7.69** | | | 4 | **396** | **8.48** | 396 | 8.49 | | |
| 736.ocio_r | 4 | 565 | 6.20 | **565** | **6.19** | | | 4 | 550 | 6.36 | **552** | **6.34** | | |
| 737.gmsh_r | 4 | 370 | 4.96 | **375** | **4.90** | | | 4 | 372 | 4.94 | **373** | **4.92** | | |
| 748.flightdm_r | 4 | 330 | 8.68 | **335** | **8.56** | | | 4 | 315 | 9.08 | **324** | **8.85** | | |
| 749.fotonik3d_r | 4 | 3213 | 1.44 | **3218** | **1.44** | | | 4 | **3227** | **1.43** | 3211 | 1.44 | | |
| 765.roms_r | 4 | **5516** | **1.14** | 5480 | 1.15 | | | 4 | **5483** | **1.15** | 5478 | 1.15 | | |
| 766.femflow_r | 4 | **1121** | **5.24** | 1118 | 5.25 | | | 4 | **1121** | **5.24** | 1118 | 5.25 | | |
| 767.nest_r | 4 | 648 | 4.90 | **649** | **4.89** | | | 4 | **640** | **4.95** | 639 | 4.97 | | |
| 772.marian_r | 4 | **716** | **8.82** | 716 | 8.82 | | | 4 | **542** | **11.7** | 533 | 11.8 | | |
| 782.lbm_r | 4 | **4532** | **0.506** | 4516 | 0.508 | | | 4 | 4462 | 0.514 | **4480** | **0.512** | | |

**SPECrate®2026_fp_base = 3.72**

**SPECrate®2026_fp_peak = 3.93**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

'ulimit -s unlimited' was used to set environment stack size limit

## Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/usr/lib64/:/usr/lib/:/lib64"
```

## Platform Notes

```
System powered via USB-C from Apple 45W USB-C power supply.
HDMI display and keyboard were disconnected during the run.

Sysinfo program /spec/cpu2026-0.902.0/bin/sysinfo
Rev: 069f95da7e7f5d81b2ce48a82150e54f
running on ci-pi5 Sat Feb  7 22:42:49 2026

SUT (System Under Test) info as seen by some common utilities.

------------------------------------------------------------
Table of contents
------------------------------------------------------------
 1. uname -srvm
 2. w
```

**(Continued on next page)**

## Platform Notes (Continued)

```
 3. Username
 4. ulimit -a
 5. sysinfo process ancestry
 6. /proc/cpuinfo
 7. lscpu
 8. numactl warning
 9. /proc/meminfo
10. Systemd service manager version: systemd 257 (257.9-1~deb13u1)
11. Services, from systemctl list-unit-files
12. Linux kernel boot-time arguments, from /proc/cmdline
13. sysctl
14. OS release
15. Disk information
16. dmidecode warning
------------------------------------------------------------

------------------------------------------------------------
1. uname -srvm
  Linux 6.12.47+rpt-rpi-2712 #1 SMP PREEMPT Debian 1:6.12.47-1+rpt1 (2025-09-16) aarch64

------------------------------------------------------------
2. w
   22:42:49 up  8:04,  0 users,  load average: 2.15, 3.47, 3.82
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU  WHAT

------------------------------------------------------------
3. Username
  From environment variable $USER:  cloyce

------------------------------------------------------------
4. ulimit -a
  time(seconds)        unlimited
  file(blocks)         unlimited
  data(kbytes)         unlimited
  stack(kbytes)        unlimited
  coredump(blocks)     0
  memory(kbytes)       unlimited
  locked memory(kbytes) 8192
  process              64597
  nofiles              1024
  vmemory(kbytes)      unlimited
  locks                unlimited
  rtprio               0

------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
```

**(Continued on next page)**

## Platform Notes (Continued)

```
 tmux a
 zsh
 runcpu --reportable -c rpi-gcc fprate
runcpu --reportable --configfile rpi-gcc --nopower --runmode rate --tune base:peak --size refrate fprate
  --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2026.012/templogs/preenv.fprate.012.0.log --lognum 012.0
   --from_runcpu 2
 specperl $SPEC/bin/sysinfo -f
$SPEC = /spec/cpu2026-0.902.0

------------------------------------------------------------
6. /proc/cpuinfo
    CPU implementer : 0x41
    CPU architecture: 8
    CPU variant     : 0x4
    CPU part        : 0xd0b
    CPU revision    : 1
   Features        : fp asimd evtstrm aes pmull sha1 sha2 crc32 atomics fphp asimdhp cpuid asimdrdm lrcpc
                     dcpop asimddp
  WARNING: the number of "processors" from /proc/cpuinfo does not seem to match the number of hardware
   threads as reported by lscpu.   Please verify counts independently.

------------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.41:
  Architecture:                            aarch64
  CPU op-mode(s):                          32-bit, 64-bit
  Byte Order:                              Little Endian
  CPU(s):                                  4
  On-line CPU(s) list:                     0-3
  Vendor ID:                               ARM
  Model name:                              Cortex-A76
  Model:                                   1
  Thread(s) per core:                      1
  Core(s) per cluster:                     4
  Socket(s):                               -
  Cluster(s):                              1
  Stepping:                                r4p1
  CPU(s) scaling MHz:                      62%
  CPU max MHz:                             2400.0000
  CPU min MHz:                             1500.0000
  BogoMIPS:                                108.00
  Flags:                                   fp asimd evtstrm aes pmull sha1 sha2 crc32 atomics fphp asimdhp
                                           cpuid asimdrdm lrcpc dcpop asimddp
  L1d cache:                               256 KiB (4 instances)
  L1i cache:                               256 KiB (4 instances)
  L2 cache:                                2 MiB (4 instances)
```

**(Continued on next page)**

## Platform Notes (Continued)

```
   L3 cache:                                2 MiB (1 instance)
   NUMA node(s):                            8
   NUMA node0 CPU(s):                       0-3
   NUMA node1 CPU(s):                       0-3
   NUMA node2 CPU(s):                       0-3
   NUMA node3 CPU(s):                       0-3
   NUMA node4 CPU(s):                       0-3
   NUMA node5 CPU(s):                       0-3
   NUMA node6 CPU(s):                       0-3
   NUMA node7 CPU(s):                       0-3
   Vulnerability Gather data sampling:      Not affected
   Vulnerability Indirect target selection: Not affected
   Vulnerability Itlb multihit:             Not affected
   Vulnerability L1tf:                      Not affected
   Vulnerability Mds:                       Not affected
   Vulnerability Meltdown:                  Not affected
   Vulnerability Mmio stale data:           Not affected
   Vulnerability Reg file data sampling:    Not affected
   Vulnerability Retbleed:                  Not affected
   Vulnerability Spec rstack overflow:      Not affected
   Vulnerability Spec store bypass:         Mitigation; Speculative Store Bypass disabled via prctl
   Vulnerability Spectre v1:                Mitigation; __user pointer sanitization
   Vulnerability Spectre v2:                Mitigation; CSV2, BHB
   Vulnerability Srbds:                     Not affected
   Vulnerability Tsa:                       Not affected
   Vulnerability Tsx async abort:           Not affected
   Vulnerability Vmscape:                   Not affected

From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL SETS PHY-LINE COHERENCY-SIZE
     L1d       64K     256K    4 Data            1  256                    64
     L1i       64K     256K    4 Instruction     1  256                    64
     L2       512K       2M    8 Unified         2 1024                    64
     L3         2M       2M   16 Unified         3 2048                    64

------------------------------------------------------------
8. numactl warning

Unable to get information from 'numactl --hardware'.  Please consider installing numactl.

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       16604176 kB

'who -r' did not return a run level

------------------------------------------------------------
```

**(Continued on next page)**

## Platform Notes (Continued)

```
10. Systemd service manager version: systemd 257 (257.9-1~deb13u1)
  Default Target  Status
  graphical       running

------------------------------------------------------------
11. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          console-setup cron dietpi-kill_ssh dietpi-postboot dietpi-preboot dietpi-ramlog
                   fake-hwclock-load fake-hwclock-save getty@ keyboard-setup networking rpi-eeprom-update ssh
                   sshd-keygen systemd-pstore systemd-timesyncd
  enabled-runtime  systemd-fsck-root systemd-remount-fs
  disabled         console-getty debug-shell dietpi-cloudshell dietpi-firstboot dietpi-fs_partition_resize
                   dietpi-vpn dietpi-wifi-monitor e2scrub_reap ifupdown-wait-online rsync sysstat
                   systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-networkd
                   systemd-networkd-wait-online systemd-networkd-wait-online@ systemd-pcrlock-file-system
                   systemd-pcrlock-firmware-code systemd-pcrlock-firmware-config systemd-pcrlock-machine-id
                   systemd-pcrlock-make-policy systemd-pcrlock-secureboot-authority
                   systemd-pcrlock-secureboot-policy systemd-sysext systemd-time-wait-sync
                   systemd-udev-load-credentials wpa_supplicant wpa_supplicant-nl80211@ wpa_supplicant-wired@
                   wpa_supplicant@
  indirect         serial-getty@ sshd@
  masked           apt-daily apt-daily-upgrade cryptdisks cryptdisks-early fake-hwclock getty-static hwclock
                   serial-getty@ttyAMA0 serial-getty@ttyS0 sudo systemd-logind x11-common

------------------------------------------------------------
12. Linux kernel boot-time arguments, from /proc/cmdline
  reboot=w
  coherent_pool=1M
  8250.nr_uarts=1
  pci=pcie_bus_safe
  cgroup_disable=memory
  numa_policy=interleave
  nvme.max_host_mem_size_mb=0
  bcm2708_fb.fbwidth=1920
  bcm2708_fb.fbheight=1080
  bcm2708_fb.fbdepth=16
  bcm2708_fb.fbswap=1
  numa=fake=8
  system_heap.max_order=0
  iommu_dma_numa_policy=interleave
  smsc95xx.macaddr=88:A2:9E:03:6B:8B
  vc_mem.mem_base=0x3fc00000
  vc_mem.mem_size=0x40000000
  root=PARTUUID=b06e45c0-02
  rootfstype=ext4
  rootwait
  fsck.repair=yes
```

**(Continued on next page)**

## Platform Notes (Continued)

```
    net.ifnames=0
    logo.nologo
    console=ttyAMA10,115200
    console=tty1

 ------------------------------------------------------------
 13. sysctl
    kernel.randomize_va_space           2
    vm.compaction_proactiveness        20
    vm.dirty_background_bytes           0
    vm.dirty_background_ratio          10
    vm.dirty_bytes                      0
    vm.dirty_expire_centisecs        3000
    vm.dirty_ratio                     20
    vm.dirty_writeback_centisecs      500
    vm.dirtytime_expire_seconds     43200
    vm.extfrag_threshold              500
    vm.min_unmapped_ratio               1
    vm.swappiness                       1
    vm.watermark_boost_factor       15000
    vm.watermark_scale_factor          10
    vm.zone_reclaim_mode                0

 ------------------------------------------------------------
 14. OS release
    From /etc/*-release /etc/*-version
    os-release Debian GNU/Linux 13 (trixie)

 ------------------------------------------------------------
 15. Disk information
 SPEC is set to: /spec/cpu2026-0.902.0
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/root      ext4  117G   22G   91G  20% /

 ------------------------------------------------------------
 16. dmidecode warning
    Could not find dmidecode

 BIOS: (could not find information)
```

## Compiler Version Notes

```
==============================================================================
C       | 782.lbm_r(base, peak)
------------------------------------------------------------------------------
gcc (Debian 14.2.0-19) 14.2.0
```

**(Continued on next page)**

## Compiler Version Notes (Continued)

```
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
------------------------------------------------------------------------------

==============================================================================
C++      | 731.astcenc_r(base, peak) 736.ocio_r(base, peak)
         | 748.flightdm_r(base, peak) 766.femflow_r(base, peak)
         | 767.nest_r(base, peak) 772.marian_r(base, peak)
------------------------------------------------------------------------------
g++ (Debian 14.2.0-19) 14.2.0
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This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
------------------------------------------------------------------------------

==============================================================================
C++, C   | 709.cactus_r(base pass 0, peak pass 0) 737.gmsh_r(base pass 0, peak
         | pass 0)
------------------------------------------------------------------------------
g++ (Debian 14.2.0-19) 14.2.0
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
------------------------------------------------------------------------------

==============================================================================
C++, C   | 709.cactus_r(base pass 0, peak pass 0) 737.gmsh_r(base pass 0, peak
         | pass 0)
------------------------------------------------------------------------------
gcc (Debian 14.2.0-19) 14.2.0
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------------------------------------------------------------------------------

==============================================================================
C++, C   | 709.cactus_r(base pass 0, peak pass 0) 737.gmsh_r(base pass 0, peak
         | pass 0)
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g++ (Debian 14.2.0-19) 14.2.0
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------------------------------------------------------------------------------

==============================================================================
```

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## Compiler Version Notes (Continued)

```
C++, C  | 709.cactus_r(base pass 0, peak pass 0) 737.gmsh_r(base pass 0, peak
        | pass 0)
------------------------------------------------------------------------------
gcc (Debian 14.2.0-19) 14.2.0
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
------------------------------------------------------------------------------

==============================================================================
Fortran | 722.palm_r(base, peak) 749.fotonik3d_r(base, peak) 765.roms_r(base,
        | peak)
------------------------------------------------------------------------------
GNU Fortran (Debian 14.2.0-19) 14.2.0
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warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
gcc

C++ benchmarks:
g++

Fortran benchmarks:
gfortran

Benchmarks using both C and C++:
g++ gcc

## Base Portability Flags

709.cactus_r: -DSPEC_LP64
722.palm_r: -DSPEC_LP64
731.astcenc_r: -DSPEC_LP64
736.ocio_r: -DSPEC_LP64
737.gmsh_r: -DSPEC_LP64
748.flightdm_r: -DSPEC_LP64
749.fotonik3d_r: -DSPEC_LP64
765.roms_r: -DSPEC_LP64

**(Continued on next page)**

## Base Portability Flags (Continued)

766.femflow_r: `-DSPEC_LP64`
767.nest_r: `-DSPEC_LP64`
772.marian_r: `-DSPEC_LP64`
782.lbm_r: `-DSPEC_LP64`

## Base Optimization Flags

C benchmarks:
`-mabi=lp64 -std=c18 -g -O3 -flto`

C++ benchmarks:
`-mabi=lp64 -std=c++17 -g -O3 -flto`

Fortran benchmarks:
`-mabi=lp64 -std=f2018 -g -O3 -flto -fallow-argument-mismatch`

Benchmarks using both C and C++:
`-mabi=lp64 -std=c++17 -std=c18 -g -O3 -flto`

## Peak Compiler Invocation

C benchmarks:
`gcc`

C++ benchmarks:
`g++`

Fortran benchmarks:
`gfortran`

Benchmarks using both C and C++:
`g++ gcc`

## Peak Portability Flags

709.cactus_r: `-DSPEC_LP64`
722.palm_r: `-DSPEC_LP64`
731.astcenc_r: `-DSPEC_LP64`
736.ocio_r: `-fno-finite-math-only(*) -DSPEC_LP64`

**(Continued on next page)**

## Peak Portability Flags (Continued)

737.gmsh_r: `-fno-fast-math`(*) `-DSPEC_LP64`
748.flightdm_r: `-fno-fast-math`(*) `-DSPEC_LP64`
749.fotonik3d_r: `-DSPEC_LP64`
765.roms_r: `-DSPEC_LP64`
766.femflow_r: `-DSPEC_LP64`
767.nest_r: `-fno-finite-math-only`(*) `-DSPEC_LP64`
772.marian_r: `-DSPEC_LP64`
782.lbm_r: `-DSPEC_LP64`

(*) Indicates a portability flag that was found in a non-portability variable.

## Peak Optimization Flags

C benchmarks:
`-mabi=lp64 -std=c18 -Ofast -mcpu=native -flto`

C++ benchmarks:

731.astcenc_r: `-mabi=lp64 -std=c++17 -Ofast -mcpu=native -flto`

736.ocio_r: `Same as 731.astcenc_r`

748.flightdm_r: `Same as 731.astcenc_r`

766.femflow_r: `basepeak = yes`

767.nest_r: `Same as 731.astcenc_r`

772.marian_r: `Same as 731.astcenc_r`

Fortran benchmarks:
`-mabi=lp64 -std=f2018 -Ofast -mcpu=native -flto`
`-fallow-argument-mismatch`

Benchmarks using both C and C++:
`-mabi=lp64 -std=c++17 -std=c18 -Ofast -mcpu=native -flto`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2026/results/flags/gcc-rev-A2.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2026/results/flags/gcc-rev-A2.xml`

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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