Inspur Corporation

Inspur NF5280M6 (Intel Xeon Gold 5318Y)

**SPEC CPU®2017 Floating Point Rate Result**

- **CPU2017 License:** 3358
- **Test Sponsor:** Inspur Corporation
- **Tested by:** Inspur Corporation
- **Test Date:** Jul-2021
- **Hardware Availability:** May-2021
- **Software Availability:** Dec-2020
- **Test Sponsor:** Inspur Corporation
- **Hardware Availability:** May-2021
- **Software Availability:** Dec-2020

**Copies**

- **503.bwaves_r**
  - Peak: 473
  - Base: 661
- **507.cactuBSSN_r**
  - Peak: 233
  - Base: 473
- **508.namd_r**
  - Peak: 233
  - Base: 473
- **510.parest_r**
  - Peak: 178
  - Base: 352
- **511.povray_r**
  - Peak: 246
  - Base: 404
- **519.lbm_r**
  - Peak: 246
  - Base: 404
- **521.wrf_r**
  - Peak: 290
  - Base: 537
- **526.blender_r**
  - Peak: 331
  - Base: 537
- **527.cam4_r**
  - Peak: 346
  - Base: 656
- **538.imagick_r**
  - Peak: 813
  - Base: 1,280
- **544.nab_r**
  - Peak: 813
  - Base: 1,280
- **549.fotonik3d_r**
  - Peak: 206
  - Base: 404
- **554.roms_r**
  - Peak: 138
  - Base: 165

**Hardware**

- **CPU Name:** Intel Xeon Gold 5318Y
- **Max MHz:** 3400
- **Nominal:** 2100
- **Enabled:** 48 cores, 2 chips, 2 threads/core
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **Cache L2:** 1.25 MB I+D on chip per core
- **Cache L3:** 36 MB I+D on chip per core
- **Other:** None
- **Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)
- **Storage:** 1 x 4 TB NVME SSD
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.2 (Ootpa)
  - 4.18.0-193.el8.x86_64
- **Compiler:**
  - C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
  - Compiler Build 20201113 for Linux;
  - C/C++: Version 2021.1 of Intel C/C++
  - Compiler Classic Build 20201112 for Linux;
  - Fortran: Version 2021.1 of Intel Fortran
  - Compiler Classic Build 20201112 for Linux
- **Parallel:** No
- **Firmware:** Version 05.00.00 released Apr-2021
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
## Results Table

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</tbody>
</table>

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
SCALING_GOVERNOR set to Performance

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/CPU2017/lib/intel64:/home/CPU2017/jem5.0.1-64"
MALLOC_CONF = "retain:true"

## General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.1
Transparent Huge Pages enabled by default
Prior to runcpu invocation

(Continued on next page)
General Notes (Continued)

Filesystem page cache synced and cleared with:
sync; echo 3>/proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
umactl --interleave=all runcpu <etc>

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.


Platform Notes

BIOS configuration:
ENERGY_PERF_BIAS_CFG mode set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
C1E Support set to Disable
Sub NUMA Cluster (SNC) set to Enable
Intel Hyper Threading Technology set to Enable

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca6c464d
running on localhost.localdomain Fri Jul 16 21:56:40 2021

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
  model name : Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
  2 "physical id"s (chips)
  96 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

(Continued on next page)
Spec CPU®2017 Floating Point Rate Result

Inspur Corporation
Inspur NF5280M6 (Intel Xeon Gold 5318Y)

SPECrate®2017_fp_base = 327
SPECrate®2017_fp_peak = 340

Platform Notes (Continued)

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2600.000
CPU max MHz: 3400.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K
NUMA node0 CPU(s): 0-11,48-59
NUMA node1 CPU(s): 12-23,60-71
NUMA node2 CPU(s): 24-35,72-83
NUMA node3 CPU(s): 36-47,84-95
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ha avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local wbnoinvd dtc qmmf ida arat pln pts avx512vbmi umip pku ospke avx512_vmbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/platform/cpufreq/cache data
cache size: 36864 KB

From numactl --hardware

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Inspur Corporation

Inspur NF5280M6 (Intel Xeon Gold 5318Y)

SPECRate®2017_fp_base = 327
SPECRate®2017_fp_peak = 340

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Jul-2021
Hardware Availability: May-2021
Software Availability: Dec-2020

WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 48 49 50 51 52 53 54 55 56 57 58 59
node 0 size: 257637 MB
node 0 free: 245308 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 60 61 62 63 64 65 66 67 68 69 70 71
node 1 size: 258042 MB
node 1 free: 248167 MB
node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 72 73 74 75 76 77 78 79 80 81 82 83
node 2 size: 258042 MB
node 2 free: 248057 MB
node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 84 85 86 87 88 89 90 91 92 93 94 95
node 3 size: 258012 MB
node 3 free: 248150 MB
node distances:
node 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10

From /proc/meminfo
MemTotal: 1056496696 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
oS-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.2 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.2"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:

(Continued on next page)
Inspur Corporation

Inspur NF5280M6 (Intel Xeon Gold 5318Y)

**SPEC CPU®2017 Floating Point Rate Result**

Copyright 2017-2021 Standard Performance Evaluation Corporation

**Inspur Corporation**

Inspur NF5280M6 (Intel Xeon Gold 5318Y)

**SPECrate®2017_fp_base = 327**

**SPECrate®2017_fp_peak = 340**

**CPU2017 License:** 3358  
**Test Date:** Jul-2021  
**Test Sponsor:** Inspur Corporation  
**Tested by:** Inspur Corporation  
**Hardware Availability:** May-2021  
**Software Availability:** Dec-2020

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**Platform Notes (Continued)**

Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020  
x86_64 x86_64 x86_64 GNU/Linux

**Kernel self-reported vulnerability status:**

- **CVE-2018-12207 (iTLB Multihit):** Not affected
- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **CVE-2017-5754 (Meltdown):** Not affected
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: usercopy/swapsqgs barriers and __user pointer sanitation
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** No status reported
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

**run-level 3 Jul 16 13:23**

**SPEC is set to: /home/CPU2017**

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<td>xfs</td>
<td>3.6T</td>
<td>98G</td>
<td>3.5T</td>
<td>3%</td>
<td>/home</td>
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**From /sys/devices/virtual/dmi/id**

- **Vendor:** Inspur
- **Product:** NF5280M6
- **Product Family:** Family
- **Serial:** 380251214

**Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.**

**Memory:**

- 32x Micron 36ASF4G72PZ-3G2R1 32 GB 2 rank 3200, configured at 2933

**BIOS:**

- **BIOS Vendor:** American Megatrends Inc.
- **BIOS Version:** 05.00.00
- **BIOS Date:** 04/25/2021
- **BIOS Revision:** 5.22

(End of data from sysinfo program)
## Compiler Version Notes

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<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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## SPEC CPU®2017 Floating Point Rate Result

### Inspur Corporation

**Inspur NF5280M6 (Intel Xeon Gold 5318Y)**

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### Compiler Version Notes (Continued)

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Inspur Corporation

Inspur NF5280M6 (Intel Xeon Gold 5318Y)

SPEC CPU®2017 Floating Point Rate Result

SPECrate®2017_fp_base = 327
SPECrate®2017_fp_peak = 340

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Jul-2021
Hardware Availability: May-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

Fortran, C | 521.wrf_r(base) 527.cam4_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
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Fortran, C | 521.wrf_r(peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
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Fortran, C | 521.wrf_r(base) 527.cam4_r(base, peak)

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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

(Continued on next page)
Inspur Corporation

Inspur NF5280M6 (Intel Xeon Gold 5318Y)

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Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-gopt-prefetch -ffinite-math-only

(Continued on next page)
Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-`-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4`
-`-nostandard-realloc-lhs -align array32byte -auto`
-`-mbranches-within-32B-boundaries -ljemalloc`
-`-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
-`-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
-`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo`
-`-no-prec-div -qopt-prefetch -ffinite-math-only`
-`-qopt-multiple-gather-scatter-by-shuffles`
-`-mbranches-within-32B-boundaries -nostandard-realloc-lhs`
-`-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:
-`-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
-`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
-`-mbranches-within-32B-boundaries -ljemalloc`
-`-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using Fortran, C, and C++:
-`-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
-`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3`
-`-no-prec-div -qopt-prefetch -ffinite-math-only`
-`-qopt-multiple-gather-scatter-by-shuffles`
-`-mbranches-within-32B-boundaries -nostandard-realloc-lhs`
-`-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Peak Compiler Invocation

C benchmarks:
- `icx`

C++ benchmarks:
- `icpx`

Fortran benchmarks:
- `ifort`

Benchmarks using both Fortran and C:
- `521.wrf_r:ifort icc`
Inspur Corporation

Inspur NF5280M6 (Intel Xeon Gold 5318Y)

SPECrate®2017_fp_base = 327
SPECrate®2017_fp_peak = 340

Peak Compiler Invocation (Continued)

527.cam4_r: ifort icx

Benchmarks using both C and C++:

511.povray_r: icpc icc
526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes

544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:

503.bwaves_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only

(Continued on next page)
### SPEC CPU®2017 Floating Point Rate Result

**Inspur Corporation**

**Inspur NF5280M6 (Intel Xeon Gold 5318Y)**

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**SPECrate®2017_fp_base = 327**

**SPECrate®2017_fp_peak = 340**

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### Peak Optimization Flags (Continued)

- **503.bwaves_r** (continued):
  - `-qopt-multiple-gather-scatter-by-shuffles`
  - `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs`
  - `-align array32byte -auto -mbranches-within-32B-boundaries`
  - `-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

- **549.fotonik3d_r**: `basepeak = yes`

- **554.roms_r**: Same as **503.bwaves_r**

### Benchmarks using both Fortran and C:

- **521.wrf_r**: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3`
  - `-ipo -no-prec-div -qopt-prefetch -ffinite-math-only`
  - `-qopt-multiple-gather-scatter-by-shuffles`
  - `-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries`
  - `-nostandard-realloc-lhs -align array32byte -auto`
  - `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

- **527.cam4_r**: `basepeak = yes`

### Benchmarks using both C and C++:

- **511.povray_r**: `-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3`
  - `-ipo -no-prec-div -qopt-prefetch -ffinite-math-only`
  - `-qopt-multiple-gather-scatter-by-shuffles`
  - `-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries`
  - `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

- **526.blender_r**: `basepeak = yes`

### Benchmarks using Fortran, C, and C++:

- **507.cactuBSSN_r**: `basepeak = yes`

---

The flags files that were used to format this result can be browsed at:

- [Intel-ic2021-official-linux64_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html)
- [Inspur-Platform-Settings-V2.0.html](http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.0.html)

You can also download the XML flags sources by saving the following links:

- [Intel-ic2021-official-linux64_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml)
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**Inspur Corporation**

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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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