Lenovo P340 Tower

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Downloads

Hardware Maintenance Manual	P340 Tower HMM
Drivers & Software	P340 Tower Drivers & Software
Available Whitepapers	RTX GPU Support Matrix Intel VROC Support To access additional whitepapers visit https://support.lenovo.com and select 'PC' then 'Workstations'

SECTION I: Platform Overview

Description	Robust, uncompromised performance: Performance and mission critical reliability are unmatched in the P340 Tower. Featuring high-end graphics and processing options and cutting-edge storage and memory technology the P340 Tower delivers an uncompromised and stylish computing experience. Expandability and usability options that allow customization to specific needs make it perfect for CAD, Design, and Healthcare. And VR-ready graphics options offer a breakthrough entry level way to create and consumer VR. Delivering value without sacrificing power make the P340 Tower perfect for serious workstation users.

CPU

Processor Support	Intel Comet Lake Xeon W-1200 Series/Core Series
Socket Type	Socket-H4 (LGA 1200)

Operating Systems

Preloaded	Windows 10 Pro 64-bit for Workstations Windows 10 Pro 64-bit Windows 10 Home 64-bit Ubuntu 20.04 LTS (configuration specific)

Memory

Slots	Up to 4 DIMMs
Channels	Supports up to 4 DIMM Sockets, 2 Channels
Type	288-Pin, 1866/2133/2400/2666/2933MHz ECC and non-ECC UDIMM
ECC Support	Yes, CPU Dependent
Speed	Up to 2933MHz
Max DIMM Size	32GB DDR4 UDIMM
Max System Memory	128GB

Storage

Total Bays/Size	2 x 3.5″ 2 x 2.5″
SATA	4 x SATA Connectors, Gen 3
PCIe	2 x M.2 PCIe Connectors, Gen 3 Onboard Additional M.2 NVMe Drives Supported by Single Adapters
Disclaimers	Additional parts/enclosures may be required for some configurations

Video

Integrated Graphics	Intel Integrated UHD Graphics 630
Discrete Graphics	PCIe Add-In-Card, Details in Section Below
Multi-GPU Support	Yes
Type	PCIe Add-In-Card
Bus Interface	PCIe x16

Slots

Slot 1	PCIe 3.0 x16, Full Height, Full Length, 75W, With Latch
Slot 2	PCIe 3.0 x1, Full Height, Full Length, 25W

Slot 3	PCIe 3.0 x4, Full Height, Half Length, 45W, With Latch (x16 Physically)

Front I/O

USB	2 x USB 3.1 Gen 2 Type-A 2 x USB 3.1 Gen 1 Type-A 1 x USB 3.1 Gen 1 Type-C
Audio	1 x Audio Jack (3.5mm) 1x Microphone Jack (3.5mm)
Media Card Reader	Optional: Front 3-in-1 Media Card Reader (USB 2.0)
Flex Module	One 3.5″ Flex Bay, Supports the Following: – Flex storage enclosure – Front-access storage enclosure

Rear I/O

USB	2 x USB 2.0 Type-A 2 x USB 3.0 Type-A
Audio	1 x Rear (Line Out); Retaskable to 5.1
DisplayPort	2 x Standard (CPU dependent) Optional 1 x Rear Port (CPU dependent)
HDMI	Optional 1 x Rear Port (CPU dependent)
Serial Port	1 x Standard Optional 1 x Rear Port
Ethernet	1 x 1GbE – RJ45
PS/2	Optional 2 x PS/2
Parallel Port	Optional 1 x Rear Bracket
Optional USB Adapter	Dual Type-C ports USB 3.1 Dual Type-A ports USB 2.0
Optional Network Adapter	Bitland BN8E88 Single Port Gigabit Ethernet Adapter Intel I210-T1 Single Port Gigabit Ethernet Adapter Intel I350-T2 Dual Port Gigabit Ethernet Adapter Intel I350-F2 Dual Port Fiber Adapter Intel I350-T4 Quad Port Ethernet Adapter Aquantia Single Port 10G Ethernet Adapter

Ethernet

Vendor	Intel Jacksonville I219LM
Speeds	10/100/1000Mbps
Functions	PXE, ASF, WOL, Jumbo Frames, Teaming
Connectors	1 x RJ45

Audio

Vendor	Realtek
Type	HD (5.1)
Internal Speaker	Yes
Connectors	2 x Front 3.5mm Jacks (Mic & Headphone) 1 x Rear 3.5mm Jacks (Line Out)
Chipset	ALC623-CG
Number of Channels	2 Channels (5.1 via driver selection)
Number of Bits/Audio Resolution	6 Channel DAC supports 16/20/24 bit PCM 2 Stereo ADC supports 16/20 bit PCM

Thermal

Temp Sensors	Ambient Sensor VR Sensor M.2 Sensor
Fans	1 x CPU Fans 1 x Rear Fan (optional) 1 x Front Fans (optional) 1 x Power Supply Fan (internal) 1 x ODD Bay Fans (optional)

Power Specifications

Power Supply	300W	500W
Power Efficiency	90% Efficient @ 50% Load	92% Efficient @ 50% Load
Main	C14	C14
Operating Voltage Range	100 – 240V	100 – 240V
Rated Voltage Range	90-264VAC	90-264VAC
Rated Line Frequency	47Hz / 63Hz	47Hz / 63Hz
Operating Line Frequency Range	50Hz / 60Hz	50Hz / 60Hz
Rated Input Current	5A	7A
Graphics	Not Available	1 x 8 pin (6+2)
Power Supply Fan	Yes	Yes
ENERGY STAR® Qualified (config dependent)	Yes	Yes
80 PLUS Compliant	Yes	Yes
Built-in Self Test (BIST) LED	No	No
Aux Power Drop	No	Yes

BIOS

Vendor	AMI

Chassis Information

Color	Raven Black
PSU	500W and 300W Available, Autosensing, 80 PLUS Platinum Qualified
Thermal Solutions	Two System Fans Standard (1 front, 1 rear), One Fan per CPU, One PSU Fan
Dimensions	170mm/6.69″ W x 315.35mm/12.42″ D x 376mm/14.8″ H
Weight	9.38kg / 20.68lbs

Packaging Dimensions

Height (mm/in)	540mm / 21.26″
Width (mm/in)	420mm / 16.54″
Depth (mm)	280mm / 11.02″
Weight (kgs/lbs)	11.99kg / 26.43lbs

Security & Serviceability

TPM	Infineon SLB9670 TPM 2.0
Asset ID	Yes, 1024 x 8bit
vPro	Intel vPro for WS (AMT 14.X)
Cable Lock Support	Yes, Optional Kensington Cable Lock
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes
Power-On Password	Yes
Setup Password	Yes
NIC LEDs (integrated)	Yes
Access Panel Key Lock	No
Boot Sequence Control	Yes
Padlock Support	Yes
Boot without keyboard and/or mouse	Yes
Access Panel	Tool-less Side Cover Removal

Optical Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Tool-less
Color coded User Touch Points	Yes
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Retained With Screws
Restore CD/DVD/USB Set	Not Included, Restore Media Available via Lenovo Customer Support Center

Operating Environment

Air Temperature	Operating: 10°C to 35°C (50°F to 95°F)
Storage	Storage: -40°C to 60°C (-40°F to 140°F) in Original Shipping Carton Storage: -10°C to 60°C (14°F to 140°F) Without Carton
Humidity	Relative Humidity Operating: 10% to 80% (non-condensing) Relative Humidity Storage/Transit: 10% to 90% (non-condensing) Wet Bulb Temperature Operating: 25°C (77°F) max Wet Bulb Temperature Non-operating: 40°C (104°F) max
Altitude	Operating: -15.2m to 3048m (-50ft to 10000ft) Storage: -15.2m to 10668m (-50ft to 35000ft)
Vibration	Package Vibration: Random,1.04G at 2-200 Hz, 15 Minutes XYZ 6 faces Operating Vibration: Random,0.27G at 5-500 Hz, 30 Minutes Per Surface (X,Y,Z) Non-Operating Vibration: Random,1.04G at 2-200 Hz, 15 Minutes Per Surface (±X,±Y,±Z)
Shock	Operation Shock: 3ms (15G) for 4 Axis (+X, -X, +Y,-Y) 3ms (30G) for 2 Axis (+Z, -Z), Half-sine Wave, Each Side Will do One Time Rack Operation Shock: 5ms (15G) for 6 Axis (+X, -X, +Y,-Y,+Z, -Z), Half-sine Wave, Each Side Will do One Time Non-operating Shock: Trapezoidal Wave, 45G, 11ms, 6 Sides (+X, -X, +Y,-Y, +Z ,-Z), Filter 300Hz, Each Side Shock One Time

SECTION II: Platform Detail

Board Size	10.51" x 9.72" (267mm x 247mm)
Layout	Custom ATX

Motherboard Core

Processor Support	Intel Comet Lake Xeon W-1200 Series/Core Series
Socket Type	Socket-H4 (LGA 1200)
Memory Support	DDR4 up to 2933MHz UDIMM Memory (ECC and non-ECC)
Voltage Regulator	125W TDP Capable
Chipset (PCH)	Intel W480 Chipset
Flash	32MB
Super I/O	Nuvoton NCT6686D-L
Clock	Intel Native isCLK
Audio	Realtek ALC623-CG Codec
Ethernet	Intel Jacksonville I219LM

Supported Components

Processor Level	Intel Comet Lake – Xeon	Intel Comet Lake – Core
Processor	W-1290P W-1270P W-1250P W-1290 W-1270 W-1250	i9-10900K i9-10900 i7-10700K i7-10700 i5-10600K i5-10600 i5-10500 i5-10400 i3-10320 i3-10300 i3-10100
Memory Type	ECC UDIMMs – 2933MHz	non-ECC UDIMMs – 2933MHz
Memory	8GB DDR4 ECC UDIMM PC4-2933 16GB DDR4 ECC UDIMM PC4-2933 32GB DDR4 ECC UDIMM PC4-2933	4GB DDR4 non-ECC UDIMM PC4-2933 8GB DDR4 non-ECC UDIMM PC4-2933 16GB DDR4 non-ECC UDIMM PC4-2933 32GB DDR4 non-ECC UDIMM PC4-2933

Storage

3.5″ SATA Hard Disk Drive (HDD)	1TB SATA HDD 7200rpm, 6Gb/s, 3.5″ 2TB SATA HDD 7200rpm, 6Gb/s, 3.5″ 4TB SATA HDD 7200rpm, 6Gb/s, 3.5″ (enterprise class)
2.5″ SATA Hard Disk Drive (HDD)	1TB 2.5″ SATA HDD 7200rpm (FIPS certified)
2.5″ SATA Solid State Drive (SSD)	512GB SATA SSD, 6Gb/s, TLC, 2.5″ OPAL 512GB SATA SSD, 6Gb/s, TLC, 2.5″, Non-OPAL 1024GB SATA SSD, 6Gb/s, TLC, 2.5″ OPAL
M.2 PCIe Solid State Drive (SSD)	256GB M.2 PCIe SSD, Gen 3 x4, NVMe, OPAL 512GB M.2 PCIe SSD, Gen 3 x4, NVMe, OPAL

	1024GB M.2 PCIe SSD, Gen 3 x4, NVMe, OPAL 1024GB M.2 PCIe SSD, Gen 3 x4, NVMe, NON-OPAL 2048GB M.2 PCIe SSD, Gen 3 x4, NVMe, OPAL
Intel Optane Storage Technology	16GB M.2 Optane Memory

RAID

RAID Levels and Requirements	Supported RAID 0/1/5/10
Notes	Supported RAID levels for a system will vary from the stated capabilities of the RAID controller due to dependencies on the number and capacity of physical disks in the system and on customer requirements for performance, fault tolerance, or data redundancy. Max supported RAID 0/1/5/10.

Optical Drive/Removable Media

DVD-ROM Drive	Slim DVD-ROM Drive
DVD Burner/CD-RW Drive	Slim DVD Burner/CD-RW Drive
Blu-Ray Burner Drive	Slim Blu-Ray ODD DVD Burner
Media Card Reader Specifications	Optional Front 3-in-1 USB 2.0 Media Card Reader

Keyboard and Pointing Devices

Keyboard	Calliope USB Keyboard Traditional USB Keyboard Traditional PS/2 Keyboard
Pointing Devices	Calliope USB Mouse PS/2 Optical Mouse Fingerprint USB Mouse

PCIe Adapters

Network	Intel I210-T1 Single Port Gigabit Ethernet Adapter Intel I350-T2 Dual Port Gigabit Ethernet Adapter Bitland BN8E88 1000M PCIe ASF
Thunderbolt	Rear Thunderbolt PCIe Adapter
USB	Rear Dual Port USB 2.0 PCIe Adapter
WiFi Cards	Intel PCIe WiFi Card With BT External Antenna Kit (AX201)
PCIe to M.2 Adapter Card	PCIe x4 to M.2 Adapter (for NVMe SSD)

SECTION III: Supported Component Detail

CPU Specifications

CPU	Intel Xeon W-1290P	Intel Xeon W-1270P	Intel Xeon W-1250P	Intel Xeon W-1290	Intel Xeon W-1270
# of Cores	10c	8c	6c	10c	8c
# of Threads	20	16	12	20	16
Processor Base Frequency	3.7GHz	3.8GHz	4.1Ghz	3.2GHz	3.4GHz
Max Turbo Frequency	5.2GHz	5.0GHz	4.8GHz	5.0GHz	4.9GHz
Cache	20M	16M	12M	20M	16M
TDP	125W	125W	125W	80W	80W

CPU Specifications

CPU	Intel Xeon W-1250	Intel Core i9-10900K	Intel Core i7-10700K	Intel Core i5-10600K	Intel Core i9-10900
# of Cores	6c	10c	8c	6c	10c
# of Threads	12	20	16	12	20
Processor Base Frequency	3.3GHz	3.7GHz	3.8GHz	4.1Ghz	2.8GHz
Max Turbo Frequency	4.7GHz	5.2GHz	5.1GHz	NA	5.1GHz
Cache	12M	20M	16M	12M	20M
TDP	80W	125W	125W	125W	65W

CPU Specifications

CPU	Intel Core i7-10700	Intel Core i5-10600	Intel Core i5-10500	Intel Core i5-10400	Intel Core i3-10320
# of Cores	8c	6c	6c	6c	4c
# of Threads	16	12	12	12	8
Processor Base Frequency	2.9GHz	3.3GHz	3.1GHz	2.9GHz	3.8GHz
Max Turbo Frequency	4.8GHz	NA	NA	NA	NA
Cache	16M	12M	12M	12M	8M
TDP	65W	65W	65W	65W	65W

CPU Specifications

CPU	Intel Core i3-10300	Intel Core i3-10100
# of Cores	4c	4c
# of Threads	8	8
Processor Base Frequency	3.7GHz	3.6GHz
Max Turbo Frequency	NA	NA
Cache	8M	8M
TDP	65W	65W

HDD Specifications

Drive	1TB SATA – 7200rpm, 6Gb/s, 2.5"	1TB SATA – 7200rpm, 6Gb/s, 3.5"	1TB SATA – 7200rpm, 6Gb/s, 3.5" Enterprise	2TB SATA – 7200rpm, 6Gb/s, 3.5"	4TB SATA – 7200rpm, 6Gb/s, 3.5"
3.5" SATA Hard Disk Drive (HDD)	Not Available	Yes	Yes	Yes	Yes
2.5" SATA Hard Disk Drive (HDD)	Yes	Not Available	Not Available	Not Available	Not Available
Connector	SATA	SATA	SATA	SATA	SATA
Transfer Rate (Gb/sec)	160MB/s OD Read	Average Data Rate, Read/Write 156MB/s	x	Average Data Rate, Read/Write 156MB/s	Sustained Data Transfer Rate 216-226MB/s
Spindle Speed (RPM)	7,200	7,200	7,200	7,200	7,200
Power Off to Spindle Stop (sec)	NA	NA	NA	NA	NA
DC Power to Drive Ready (sec)	3.5	<10.0	<17.0	<17.0	<17.0
Average Latency (msec)	4.2	4.16	4.16	4.16	4.16
Input (VDC)	5	5	5	5	5
Typical (Watts)	1.9	6.19	10.09	6.7	11.33
Idle (Watts)	0.7	4.6	4.86	4.5	5.45
Physical Dimensions	69.85mm x 100.34mm x 7mm	101.6mm x 146.99mm x 19.88mm	101.85mm x 147mm x 26.1mm	101.6mm x 146.99mm x 26.1mm	101.85mm x 147mm x 26.1mm
Weight (grams)	90	420	620	535	650
Operating (C) Ambient	0 to 60	0 to 60	5 to 60	0 to 60	5 to 60
Operating (C) Base Casting	60	60	60	60	60
Non-Operating (C) Ambient	(-40 to 70)	(-40 to 70)	(-40 to 70)	(-40 to 70)	(-40 to 70)
Gradient (C per Hour)	20	20	20	20	20
Operating (Gs @ 2ms)	400	70	Read 70 Gs / Write 40	80	Read 70 Gs / Write 40

			Gs		Gs
Non-Operating (Gs @ 2ms)	1000	350	300	300	300

HDD Specifications

Drive	6TB SATA – 7200rpm, 6Gb/s, 3.5″
3.5″ SATA Hard Disk Drive (HDD)	Yes
2.5″ SATA Hard Disk Drive (HDD)	Not Available
Connector	SATA
Transfer Rate (Gb/sec)	Sustained Data Transfer Rate 216-226MB/s
Spindle Speed (RPM)	7,200
Power Off to Spindle Stop (sec)	NA
DC Power to Drive Ready (sec)	<17.0
Average Latency (msec)	4.16
Input (VDC)	5
Typical (Watts)	1318
Idle (Watts)	6.21
Physical Dimensions	101.85mm x 147mm x 26.1mm
Weight (grams)	716
Operating (C) Ambient	5 to 60
Operating (C) Base Casting	60
Non-Operating (C) Ambient	(-40 to 70)
Gradient (C per Hour)	20
Operating (Gs @ 2ms)	Read 70 Gs / Write 40 Gs
Non-Operating (Gs @ 2ms)	250

Solid State Storage Specifications

Drive	512GB SATA3 – SSD, 6Gb/s, 2.5″ Non-OPAL	512 GB SATA3 – SSD, 6Gb/s, 2.5″ OPAL	1024 GB SATA3 – SSD, 6Gb/s, 2.5″ OPAL	NVMe 2280 M.2 256GB PCIe SSD (OPAL)	NVMe 2280 M.2 512GB PCIe SSD (OPAL)
Dimensions Millimeters (W x D x H)	70 x 100 x 7.0	70 x 100 x 7.0	70 x 100 x 7.0	22 x 80 x 3	22 x 80 x 3
Interface Type	SATA-III	SATA-III	SATA-III	PCIe Gen 3×4	PCIe Gen 3×4
Power Active (AVG)	1.9W	1.9W	2.2W	5.0W	5.0W

Power Idle	50 mW	50 mW	50 mW	50 mW	50 mW
Typical Sequential Read	540 MB/s	540 MB/s	540 MB/s	3000 MB/s	3000 MB/s
Typical Sequential Write	500 MB/s	500 MB/s	500 MB/s	1500 MB/s	2400 mB/s
Typical Random Read (4GB Span)	75K IOPS	75K IOPS	75K IOPS	240,000 IOPS	400,000 IOPS
Typical Random Write (4GB Span)	84K IOPS.	84K IOPS.	84K IOPS.	230,000 IOPS	350,000 IOPS
Operating Temperature Range	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Endurance Rating (Lifetime Writes)	150 TB	150 TB	300 TB	85 TB	150 TB
Mean Time Between Failures (MTBF)	2.0M POH	2.0M POH	2.0M POH	2.0M POH	2.0M POH
Hardware Encryption	Not Available	AES 256 bit	AES 256 bit	AES 256 bit	AES 256 bit
Disclaimers	SSD performance measured with Crystal Disk Mark version 6.0.2 with the default 1000 MB data set. Sequential measurements are with 1 Thread, Queue-Depth 32. Random measurements are with 4 threads and queue-depth 32.				

Solid State Storage Specifications

Drive	NVMe 2280 M.2 1TB PCIe SSD (OPAL)	NVMe 2280 M.2 2TB PCIe SSD (OPAL)	NVMe 2280 M.2 1TB PCIe SSD (non-OPAL)
Dimensions Millimeters (W x D x H)	22 x 80 x 3	22 x 80 x 3	22 x 80 x 3
Interface Type	PCIe Gen 3x4	PCIe Gen 3x4	PCIe Gen 3x4
Power Active (AVG)	5.0W	5.0W	5.0W
Power Idle	50 mW	50 mW	50 mW
Typical Sequential Read	3000 MB/s	3000 MB/s	3000 MB/s
Typical Sequential Write	2700 MB/s	3000 MB/s	2700 MB/s
Typical Random Read (4GB Span)	550,000 IOPS	600,000 IOPS	550,000 IOPS
Typical Random Write (4GB Span)	500,000 IOPS	500,000 IOPS	500,000 IOPS
Operating Temperature Range	0 to 55°C	0 to 55°C	0 to 55°C
Endurance Rating (Lifetime Writes)	300 TB	600 TB	300 TB
Mean Time Between Failures (MTBF)	2.0M POH	2.0M POH	2.0M POH
Hardware Encryption	AES 256 bit	AES 256 bit	Not Available

Optical Drive Specifications

Description	9mm Slim DVD ROM Drive (SATA)- No OS/Linux	9mm Slim DVD ROM Drive (SATA)- Win10	9mm Slim DVD Burner/CD-RW Drive (SATA)- No OS/Linux	9mm Slim DVD Burner/CD-RW Drive (SATA)- Win10	9mm Slim Blu-Ray ODD DVD Burner (SATA)- No OS/Linux
Interface Type	SATA 1.5 Gb/s	SATA 1.5 Gb/s	SATA 1.5 Gb/s	SATA 1.5 Gb/s	SATA 1.5 Gb/s
Dimensions	128±0.4×9.0 ±0.4×127±0. 4(Max) Unit:mm (Without Bezel-W x H x D)	128±0.4×9.0 ±0.4×127±0. 4(Max) Unit:mm (Without Bezel-W x H x D)	128±0.4×9.0 ±0.4×127±0. 4(Max) Unit:mm (Without Bezel-W x H x D)	128±0.4×9.0 ±0.4×127±0. 4(Max) Unit:mm (Without Bezel-W x H x D)	128±0.4×9.0 ±0.4×127±0. 4(Max) Unit:mm (Without Bezel-W x H x D)
Disc Capacity	NA	NA	NA	NA	NA
Type	DVDROM	DVDROM	DVDWriter	DVDWriter	BD Rambo
External Dimensions	NA	NA	NA	NA	NA
Speed	NA	NA	NA	NA	NA
Bay Type	9.0mm Tray	9.0mm Tray	9.0mm Tray	9.0mm Tray	9.0mm Tray
Color	Business Black or without bezel	Business Black or without bezel	Business Black or without bezel	Business Black or without bezel	Business Black or without bezel
Removable	No	No	No	No	No
Internal Buffer Size	0.5MB Min	0.5MB Min	0.5MB Min	0.5MB Min	4MB
Writes	NA	NA	8XDVD+R / 8XDVD+RW / 6XDVD+R DL 8XDVD-R / 6XDVD-RW / 6XDVD-R DL 24XCD-R / 16XCD-RW	8XDVD+R / 8XDVD+RW / 6XDVD+R DL 8XDVD-R / 6XDVD-RW / 6XDVD-R DL 24XCD-R / 16XCD-RW	6x BD-R / 2x BD-RE 8XDVD+R / 8XDVD+RW / 6XDVD+R DL 8XDVD-R / 6XDVD-RW / 6XDVD-R DL 5XDVD-RAM 24XCD-R / 16XCD-RW
Reads	8XDVD-ROM / 24XCD-ROM	8XDVD-ROM / 24XCD-ROM	8XDVD-ROM / 24XCD-ROM	8XDVD-ROM / 24XCD-ROM	6x BD-ROM /8x DVD-ROM / 5x DVD-RAM / 24x CD-ROM
Source	DC Power 5V	DC Power 5V	DC Power 5V	DC Power 5V	DC Power 5V
DC Power Requirements	+5V±5%	+5V±5%	+5V±5%	+5V±5%	+5V±5% Ripple less than 100mVp-p
DC Current	Max 2.5A@5v	Max 2.5A@5v	Max 2.5A@5v	Max 2.5A@5v	Max 2A@5v
Operating Systems	All Windows	All Windows	All Windows	All Windows	All Windows

Supported	OS	OS	OS	OS	OS
Temperature	Operating: 5ºC to 45 ºC Non-Operating:-30ºC to 60ºC	Operating: 5ºC to 45 ºC Non-Operating:-30ºC to 60ºC	Operating: 5ºC to 45 ºC Non-Operating:-30ºC to 60ºC	Operating: 5ºC to 45 ºC Non-Operating:-30ºC to 60ºC	Operating: 5ºC to 45 ºC Non-Operating:-30ºC to 60ºC
Relative Humidity	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportation> 10 % to 80 % (Non-Condensing)	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportation> 10 % to 80 % (Non-Condensing)	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportation> 10 % to 80 % (Non-Condensing)	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportation> 10 % to 80 % (Non-Condensing)	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportation> 10 % to 80 % (Non-Condensing)

Optical Drive Specifications

Description	9mm Slim Blu-Ray ODD DVD Burner (SATA)- Win10
Interface Type	SATA 1.5 Gb/s
Dimensions	128±0.4×9.0 ±0.4×127±0.4(Max) Unit:mm（Without Bezel-W x H x D)
Disc Capacity	NA
Type	BD Rambo
External Dimensions	NA
Speed	NA
Bay Type	9.0mm Tray
Color	Business Black or without bezel
Removable	No
Internal Buffer Size	4MB
Writes	6x BD-R / 2x BD-RE 8XDVD+R / 8XDVD+RW / 6XDVD+R DL 8XDVD-R / 6XDVD-RW / 6XDVD-R DL 5XDVD-RAM 24XCD-R / 16XCD-RW
Reads	6x BD-ROM /8x DVD-ROM / 5x DVD-RAM / 24x CD-ROM
Source	DC Power 5V
DC Power Requirements	+5V±5% Ripple less than 100mVp-p
DC Current	Max 2A@5v
Operating Systems Supported	All Windows OS
Temperature	Operating: 5ºC to 45 ºC Non-Operating:-30ºC to 60ºC

Relative Humidity	Operating > Read: 15 % to 85 % (Non-Condensing) Write 15 % to 80 % (Depend on the Temperature) Storage/Transportation> 10 % to 80 % (Non-Condensing)

Integrated Graphics Adapter

Type	Intel UHD Graphics 630
Display Interface	1x DP 1.2, 1x HDMI 1.4
Video Resolution (max)	4096x2304 @ 60Hz (DP), 4096x2304 @ 24Hz (HDMI)

Discrete Graphics Adapter

Adapter	Quadro P400	Quadro P620	Quadro P1000	Quadro P2200	Quadro RTX 4000
Bus Interface	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16
Display Interface	3 x mDP 1.4	4 x mDP 1.4	4 x mDP 1.4	4 x DP 1.4	3 x DP 1.4 1 x VirtualLink
Graphics Chipset	Pascal	Pascal	Pascal	Pascal	Turing
Memory Clock Frequency (MHz)	1003MHz	1252MHz	1253MHz	1251MHz	1625MHz
Memory Size	2GB GDDR5	2GB GDDR5	4GB GDDR5	5GB GDDR5X	8GB GDDR6
Memory Interface	64-bit	128-bit	128-bit	160-bit	256-bit
Memory Bandwidth	Up to 32GB/s	Up to 80GB/s	Up to 82GB/s	Up to 200GB/s	Up to 416GB/s
GPU Cores	CUDA Cores: 256	CUDA Cores: 512	CUDA Cores: 640	CUDA Cores: 1280	CUDA Cores: 2304 Tensor Cores: 288 RT Cores: 36
GPU Core Frequency (MHz)	1228MHz	1266MHz	1266MHz	1000MHz	1005MHz
Maximum Power Consumption	30W	40W	47W	75W	Total board power: 160W Total graphics power: 125W
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or Digital)	3 x 4096x2160 @ 60Hz 1 x 5120x2880 @ 60Hz	4 x 4096x2160 @ 60Hz 4 x 5120x2880 @ 60Hz	4 x 4096x2160 @ 60Hz 4 x 5120x2880 @ 60Hz	4 x 4096x2160 @ 120Hz 4 x 5120x2880 @ 60Hz	4 x 3840x2160 @ 120Hz 4 x 5120x2880 @ 60Hz 4 x 7680x4320 @ 60Hz
Thermal Solution	Ultra-quiet Active	Ultra-quiet Active	Ultra-quiet Active	Ultra-quiet Active	Ultra-quiet Active

	Fansink	Fansink	Fansink	Fansink	Fansink
Dimension	2.713" H x 5.7" L Single Slot, Low Profile	2.713" H x 5.7" L Single Slot, Low Profile	2.713" H x 5.7" L Single Slot, Low Profile	4.4" H x 7.9" L Single Slot	4.4" H x 9.5" L Single Slot
Advanced Display	Not Available	Not Available	Not Available	Not Available	SYNC 2
SLI/NVLink Support	Not Available	Not Available	Not Available	Not Available	Not Available

Discrete Graphics Adapter

Adapter	Quadro RTX 5000	GeForce GTX 1660Ti	GeForce RTX2060 CD	GeForce RTX2070 CD	Geforce GTX1650Super	Geforce GTX1660Super
Bus Interface	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCIe 3.0 x16	PCI Express 3.0x16	PCI Express 3.0x16
Display Interface	Four DisplayPorts, One VirtualLink port	DVI-D(1), DP(1), HDMI(1)	DP*1 + HDMI*1 + DVI-D*1	DP*1 + HDMI*1 + DVI-D*1	DP*2 + HDMI*1	DP*1 + HDMI*1 + DVI-D*1
Graphics Chipset	TU104-875-A1	TU116-400-A1	TU116-400-A1	X	TU116-250-KC-A1	TU116-300-A1
Memory Clock Frequency (MHz)	7001MHz	6000MHz	7000MHz	7000MHz	6000MHz	7000MHz
Memory Size	16384 MB	6GB GDDR6	6GB GDDR6	6GB GDDR6	4GB GDDR6	4GB GDDR6
Memory Interface	256-bit	192-bit	192-bit	256-bit	128-bit	128-bit
Memory Bandwidth	up to 448 GB/s	–	–	–	192.03 GB/s	336GB/s
GPU Cores	–	–	–	–	CUDA:1280 Tensor: N/A RT: N/A	CUDA:1408 Tensor: N/A RT: N/A
GPU Core Frequency (MHz)	1815 MHz(Boost)/1620(Base)	Base:1500 MHz (NV SPEC) Boost:1770MHz (NV SPEC)	Base:1500 MHz (NV SPEC) Boost:1770MHz (NV SPEC)	X	Base:1530 MHz Boost:1725MHz	Base:1530 MHz (NV SPEC) Boost:1785MHz (NV SPEC)
Maximum Power Consumption	265W	120W	170W	175W	100W	125W
Supported Resolutions and Max Refresh Rates (Hz) (Note: Analog and/or Digital)	DP1.4a: Maximum pixel clock2: Up to 2660 MPixels per second Maximum	DP:5120*2880@60Hz (NV SPEC) HDMI:4096*2160@60Hz (NV SPEC)	DP:5120*2880@60Hz (NV SPEC) HDMI:4096*2160@60Hz (NV SPEC)	X	HDMI：4096*2160@60Hz DP：7680*4320@30Hz	DP:5120*3200*24bpp@60Hz HDMI:4096*2160*24bpp@60Hz DVI-D:2560*16

	raw bandwidth3: 32.4 Gbps Example of maximum resolutions with CVT-RB timings: •7680 × 4320 × 24 bpp at 120Hz •7680 × 4320 × 24 bpp at 60Hz •7680 × 4320 × 36 bpp at 60Hz •5120 × 3200 × 24 bpp at 60Hz •5120 × 2880 × 24 bpp at 60Hz USB-C: USB-C port has the display capabilities of a DP 1.4a port. A USB-C-to-DP dongle can be used with this port. Port also provides the following capabilities: •7680 × 4320 × 24 bpp at 120Hz •7680 × 4320 × 36 bpp at 60Hz •5120 × 3200 × 24 bpp at 60Hz •VirtualLink support •USB 3.1 Gen2 SuperSpeed (10 Gbps) support •USB 2.0 support					00*24bpp @60Hz

Thermal Solution	–	–	–	–	9215FAN+ AL heat sink	Axial fan
Dimension	4.37 inches x 10.5 inches, Double wide 975 Grams	158mm x 111mm x 42mm	214mm x 117mm x 42mm	227mm x 111mm x 42mm	183mm*131mm*42mm(Length, width, thickness)	144.75mm*111.15mm*41.85mm(Length, width, thickness)
Advanced Display	–	–	–	–	DP*2/HDMI*1	DVI-D*1/DP*1/HDMI*1
SLI/NVLink Support	–	–	–	–	NO	No

Intel® Ethernet Specifications

Card	Intel I210-T1 Single Port Gigabit Ethernet Adapter (Springville)	Intel I350-T2 Dual Port Gigabit Ethernet Adapter (Stony Lake T2)	Intel I350-T4 Quad Port Gigabit Ethernet Adapter (Stony Lake T4)	Bitland BN8E88 1000M PCIex1 noASF – FH/LP	Intel® I350-F2 Dual Ports PCIex4 Gigabit Ethernet Adapter
Supplier PN	I210T1, MM# 941033	I350T2G1P20, MM# 928941	I350T4G1P20, MM# 928942	1218-00934/1218-00933	X
Data Rates Supported	10/100/1000 Mbps copper	10/100/1000 Mbps (Copper), 1000Mbps (Fiber)	10/100/1000 Mbps (Copper), 1000Mbps (Fiber)	10M, 100M, and 1000M	10/100/1000 Mbps (Fiber),
Controller Details	Intel® Ethernet Controller I210	Intel Ethernet Controller I350	Intel Ethernet Controller I351	REALTEK RTL8168E-VB-CG	X
Controller Bus Architecture	PCIe 2.1 (5GT/s)	PCIe 2.1 (5GT/s)	PCIe 2.1 (5GT/s)	PCI Express 1.1 2.5GT/s	X
Data Transfer Mode	Ethernet	Ethernet	Ethernet	Ethernet	Ethernet
Power Consumption	0.81W	Copper: I350-T2 V2= 4.4W Fiber: I350-F2= 5.5W	Copper: I350T4V2= 5W LC-Fiber: I350F4= 6W	RTL8168E=0.53W	I350-F2= 5.5W
IEEE Standards Compliance	IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T	IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T	IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T	IEEE 802.1P Layer 2 Priority Encoding IEEE 802.1Q VLAN tagging IEEE 802.3az Draft 3.2 (EEE)	IEEE 802.3/10BASE-T, 100BASE-TX, 1000BASE-T
Boot ROM Support	PXE boot, Intel iSCSI Remote	PXE boot, Intel iSCSI Remote	PXE boot, Intel iSCSI Remote	Supported	PXE boot, Intel iSCSI Remote

	Boot for Windows, Linux and Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI	Boot for Windows, Linux and Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI	Boot for Windows, Linux and Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI		Boot for Windows, Linux and Vmware, Intel BootAgent Software via PXE or BootP, WDMS or UEFI
Network Transfer Mode (Full/Half Duplex)	Supported	Supported	Supported	Supported	Supported
Network Transfer Rate	1,000Mbps Full Duplex	1,000Mbps Full Duplex	1,000Mbps Full Duplex	1,000Mbps Full Duplex	1,000Mbps Full Duplex
Operating System Driver Support	Windows 7/8/10, Linux, Free BSD, XEN,Vmware	Windows 7/8/10, Linux, Free BSD, XEN,Vmware	Windows 7/8/10, Linux, Free BSD, XEN,Vmware	Win10	Windows 7/8/10, Linux, Free BSD, XEN,Vmware
Manageability	Supported	Supported	Supported	Supported	Supported
Manageability Capabilities Alerting	Supported	Supported	Supported	Supported	Supported
TDP	Firmware Based Thermal Management	Firmware Based Thermal Management	Firmware Based Thermal Management	Not Available	Firmware Based Thermal Management
Operating Temperature Range	0°C to 55°C (32°F to 131°F)	0°C to 55°C (32°F to 131°F)	0°C to 55°C (32°F to 131°F)	O ℃, 50 ℃ (32 ° F to 122 ° F)	0°C to 55°C (32°F to 131°F)
# of Ports	1	2	4	1	1
Data Rate Per Port	10/100/1000 Mbps (copper)	10/100/1000 Mbps (copper), 1000Mbps (fiber)	10/100/1000 Mbps (copper), 1000Mbps (fiber)	10M, 100M, and 1000M	10/100/1000 Mbps (fiber)
System Interface Type	PCIe Gen 2.1	PCIe Gen 2.1	PCIe Gen 2.1	PCI Express 1.1	PCIe Gen 2.1
NC Sideband Interface	Not Available	Not Available	Not Available	Not Available	Not Available
Jumbo Frames Supported	Yes	Yes	Yes	Yes	Yes
1000Base-T	Yes	Yes	Yes	Yes	Yes
IEEE 1588	Supported	Supported	Supported	Not Available	Supported
Supported Under vPro	Not Available	Not Available	Not Available	Not Available	Not Available

Intel® Ethernet Specifications

Card	Aquantia PCIex4 10GbE AQN-107 Gigabit Ethernet Adapter	2 x 2 AX WiFi with BT (M.2) vPro AX201-TWR/SFF
Supplier PN	AQN-107-124-SBL	X
Data Rates Supported	10G/5G/2.5G/1G/100Mbps	X

Controller Details	AQC107	X
Controller Bus Architecture	PCIe Gen3	X
Data Transfer Mode	Ethernet	X
IEEE Standards Compliance	IEEE802.3an 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX	X
Boot ROM Support	PXE boot UEFI boot	X
Network Transfer Mode (Full/Half Duplex)	Supported	X
Network Transfer Rate	10Gbps Full Duplex	X
Operating System Driver Support	Microsoft® Windows® 10, 8.1, 8, 7 (32/64-bit), and Linux 3.2. 3.10, 3.12, 4.2, and 4.4 drivers	X
Operating Temperature Range	0°C – 108°C	
# of Ports	1	X
Data Rate Per Port	10G/5G/2.5G/1G/100Mbps	X
System Interface Type	PCIe Gen3 x4	X
Jumbo Frames Supported	Yes	X
1000Base-T	Yes	X
MACsec IEEE 802.1 AE	Supported	X
IEEE 1588	Supported	X
Supported Under vPro	Not	X

Ethernet

Model	i210-T1	I350-T2	I350-T4	Bitland BN8E88 1000M PCIex1 noASF – FH/LP	Intel® I350-F2 Dual Ports PCIex4 Gigabit Ethernet Adapter
Connector	RJ-45 Copper	2 x Ports RJ-45 Copper	4 x Ports RJ-45 Copper	1 Port RJ-45	LC Fiber Optic
Website	i210 T1	i350 T2	i350 T4	IC Datasheet	X
Auto-Negotiation	IEEE* 802.3* Auto-negotiaton	IEEE* 802.3* Auto-negotiaton	IEEE* 802.3* Auto-negotiaton	Auto-Negotiation with Next Page capability	IEEE* 802.3* Auto-negotiaton
Intel® vPro™	Not Available	Not Available	Not Available	Not Available	Not Available
Intel® Stable Image Platform Program (SIPP)	Not Available				
Intel® Standard Manageablity	Supported	Supported	Supported	Not Available	Supported

Power Optimizer Platform Low-power Management Systems	Supported	Supported	Supported	Supported	Supported
Energy Efficient Ethernet	Supported	Supported	Supported	Supported	Supported
TCP/UDP Checksum and Segmentation Offload (IPv4 and IPv6)	Supported	Supported	Supported	Supported	Supported
Receive Side Scaling	Supported	Supported	Supported	Supported	Supported
Dual Tx and Rx Queues	Yes	Yes	Yes	Not Available	Yes
Jumbo Frames (up to 9KB)	Supported	Supported	Supported	Supported	Supported
Teaming	Supported	Supported	Supported	Supported	Supported
Wake from Deep Sx	Supported	Supported	Supported	Supported	Supported
Server Operating System Support	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SLES), Free BSD, Xen, Vmware	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SLES), Free BSD, Xen, Vmware	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SLES), Free BSD, Xen, Vmware	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SLES), Vmware	Windows Server 2008, 2012, 2016. 2019 Linux (RHEL/SLES), Free BSD, Xen, Vmware
Network Proxy/ARP Support	Supported	Supported	Supported	Supported	Supported

Ethernet

Model	Aquantia PCIex4 10GbE AQN-107 Gigabit Ethernet Adapter	2 x 2 AX WiFi with BT (M.2) vPro AX201-TWR/SFF
Connector	1xRJ45	X
Auto-Negotiation	IEEE* 802.3* Auto-negotiaton	x
Energy Efficient Ethernet	Supported	x
TCP/UDP Checksum and Segmentation Offload (IPv4 and IPv6)	Supported	x
Receive Side Scaling	Supported	x
Jumbo Frames (up to 9KB)	Supported(Up to 16KB)	x
Server Operating System Support	Microsoft® Windows® 10, 8.1, 8, 7 (32/64-bit), and Linux 3.2. 3.10, 3.12, 4.2, and 4.4 drivers	x
Network Proxy/ARP Support	Supported	x

Media Card Reader

Description	Media Card reader (3 in 1) TWR
Interface Type	USB2.0

Form Factor	USB 2.0 Mass Storage Device

SECTION IV: BIOS / Certifications / Standards / Environmental

BIOS Specifications

WMI Support	Compliant With Microsoft WBEM and the DMTF Common Information Model
ROM-Based Setup Utility (F1)	System Configuration Setup Program (text only interface) Available at Power-on With F1 Key
Bootblock Recovery	Recovers System BIOS if the Flash ROM Becomes Corrupted
Replicated Setup	Saves System Configuration Settings to a File That Can Then be Used to Replicate the Settings to Other Systems
Boot Control	Boot Control Available Through ROM-based Setup Utility or With F12 Key at Power-on
Memory Change Alert	Power-on Error Message in the Event of a Decrease in System Memory
Thermal Alert	Power-on Error message in the Event of a Fan Failure
Asset Tag	Supports Ability to Set SMBIOS Type 2 Baseboard Asset Tag Field
System/Emergency ROM Flash Recovery with Video	Supports Process to Recover the System BIOS if the Flash ROM Becomes Corrupted
Remote Wakeup/Remote Shutdown	System Admin Can Power On/Off a Client Computer from a Remote Location to Provide Maintenance
Quick Resume Time	Supports Low Power S3 (suspend to RAM) and Prompt Resume Times
ROM Revision Level	System UEFI (BIOS) Version Reported in SMBIOS Type 0 Structure and in BIOS Setup
Keyboard-less Operation	System Can be Booted Without a Keyboard
Per-port Control	Allows I/O Ports to be Individually Enabled/Disabled Through ROM-based Setup or WMI Interface
Adaptive Cooling	Offers Multiple Settings for Fan Control Ranging Between Better Performance and Better Acoustics
Security	Supervisor, SMP and Power-On Passwords Can Protect Boot and ROM-based Setup – Support Electronic Lock – Chassis Intrusion Detection – UEFI Secure Boot Support – HDD Password Can Protect HDD Data – Windows UEFI Firmware Update Support – Device Guard Support – Optional Access Panel Lock, Kensington Lock, and Pad Lock, BIOS Guard, Boot Guard
Intel(R) AMT (includes ASF 2.0)	Allows System to be Supported from a Remote Location

Intel(R) TXT	Intel(R) Trusted Execution Technology Provides a Security Foundation to Build Protections Against Software Based Attacks
Memory Modes	Supports Mirroring, Lock Step, and Sparing Memory Modes
Windows 10 Ready	Supports Windows 10 Requirements for Secure Flash, UEFI v 2.6 Device Guard Support Spec

Industry Standard Specification Support

UEFI	Unified Extensible Firmware Interface v2.7
ACPI (Advanced Configuration and power Management Interface)	Advanced Configuration and Power Interface v6.2
ASF 2.0	DMTF Alert Standard Format Specification v2.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6)
CD Boot	El Torito Bootable CD-Rom Format Specification, v1.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision v1.0
PCI	NA (No PCI slot)
PCI Express	PCI Express Base Specification v3.0
SATA	Serial ATA Revision 3.0 Specification
TPM	Trusted Computing Group TPM Specification v2.0
UHCI	Universal Host Controller Interface Design Guide, Revision v1.1
USB	Universal Serial Bus Revision v1.1 Universal Serial Bus v2.0 Universal Serial Bus v3.0 Universal Serial Bus v3.2
SMBIOS	DMTF System Management Spec v3.2.1
XHCI	XHCI SPEC Revision v1.2

Social and Environmental Responsibility

Quality Control	Lenovo is a member of an eco declaration system that enforces regular independent quality control
Hazardous Substances and Preparation	• Products do not contain more than; 0.1% lead, 0.01% cadmium, 0.1% mercury, 0.1% hexavalent chromium, 0.1% polybrominated biphenyls (PBB) or 0.1% polybrominated diphenyl ethers (PBDE). (See legal reference and Note B1) • Products do not contain Asbestos • Products do not contain Ozone Depleting Substances: Chlorofluorocarbons (CFC), hydrobromofluorocarbons (HBFC), hydrochlorofluorcarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide • Products do not contain more than; 0.005% polychlorinated biphenyl (PCB), 0.005% polychlorinated terphenyl (PCT) in preparation • Products do not contain more than 0.1% short chain chloroparaffins (SCCP) with 10-13 carbon atoms in the chain containing at least 48% per mass of chlorine in the SCCP • Parts with direct and prolonged skin contact do not release nickel in concentrations above 0.5 microgram/cmÂ²/week REACH Article 33 information about substances in articles is available

	at: https://www.lenovo.com/us/en/social_responsibility/social_responsibility_resources/
Batteries	UN38.3,MSDS
Safety, EMC Connection to the Telephone Network and Labeling	Not applicable

Safety, EMC Connection to the Telephone Network and Labeling

Industry Standard Specifications	not applicable
Remote Manageability Software Solutions	not applicable
System Software Manager	Lenovo ThinkStation supports software management tools by Lenovo Vantage.

Regulations & Standards

EMC & Safety	FCC/IC VCCI BSMI KC RCM Brazil-INMETRO TUV-GS cTUVus IEC60950-1&IEC62368 CB Report/Certificate Saudi Arabia EQM Kuwait KUCAS China CCC Mark Singapore PSB South Africa SABS Russia/Belarus/Kazakhstan/Kyrgyzstan/Armenia-EAC Morocco-CM Mexico-NOM Serbia KVALITET Ukraine UKrCEPRO India-BIS China SRRC Indonesia-SDPPI Malaysia-SIRIM Philippines-NTC

Environmentals

Energy Star	ENERGY STAR 8.0
EPEAT	EPEAT Certification Available on Select Models
ErP Lot-3 2013	Yes

Hazardous Substances	• Products do not contain more than; 0.1% lead, 0.01% cadmium, 0.1% mercury, 0.1% hexavalent chromium, 0.1% polybrominated biphenyls (PBB) or 0.1% polybrominated diphenol ethers (PBDE) • Products do not contain Asbestos • Products do not contain Ozone Depleting Substances: Chlorofluorocarbons (CFC), hydrobromofluorocarbons (HBFC), hydrochlorofluorcarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide • Products do not contain more than; 0.005% polychlorinated biphenyl (PCB), 0.005% polychlorinated terphenyl (PCT) in preparation • Products do not contain more than 0.1% short chain chloroparaffins (SCCP) with 10-13 carbon atoms in the chain containing at least 48% per mass of chlorine in the SCCP • Parts with direct and prolonged skin contact do not release nickel in concentrations above 0.5 microgram/cm_/week