



Raise productivity and reduce downtime with rugged computers

Guidelines for companies in the manufacturing industry: When is it worthwhile to invest in special, tough mobile devices rather than ordinary consumer products?

Mobile computers as a business-critical tool for the manufacturing industry

With the advancement of digitisation and automation, computers have become indispensable elements of manufacturing, production lines and storage facilities. They are used by employees to control production, warehouse flows, teams and workflows.

Since they are used at critical points, mobile devices such as tablets and notebooks must operate with high levels of reliability and be fully functional under all conditions. The results of IT failure can be detrimental and have an impact on lost work

time, lower productivity, later deliveries and in worse cases, interruptions to production.

Therefore, choosing suitable devices which are built for purpose is crucial for a business, especially those operating in industrial enterprise such as industrial manufacturing.

Industrial manufacturing places particular demand on mobile computers

Businesses today can choose from hundreds of different computers offering a wide range of functions, operating systems and price ranges to support their manufacturing, logistics and other mobile company activities.

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Yet not all these devices are equally suited to every task. In industrial manufacturing, in particular, end user devices must be used under the most testing conditions:

- Employees are required to be mobile in their work environment and this can pose challenges for conventional laptops or tablets, resulting in damage. Rugged devices are built to enable mobility in challenging environments and are able to function effectively under extreme climatic conditions and are able to withstand shocks and accidental drops.
- In environments with harsh conditions, accidents can easily put a conventional computer out of use. In the worst case, this can result in costly production downtimes.
- As well as high reliability, the productivity of employees must also be consistently ensured. Tablets and laptops must be useable under all kinds of external conditions and need to offer adequate run times and performance.

Companies in manufacturing and logistics are therefore well advised to inform themselves about the difference between rugged devices suitable for industry and conventional consumer computers. Opting for a particular type of device is not always straightforward. This is because the cost/benefit analysis requires extensive examination of multiple factors. Additionally, the right choice depends on the specific work processes, the usage environment, user preferences and budget.

Rugged computers compared with conventional devices

Rugged computers have many features in common with conventional computers in terms of hardware and operation. This means that many tasks in the industrial environment can be performed using consumer products. On the other hand, so-called 'rugged' computers designed for industrial use differ significantly from consumer devices in terms

of their robustness, reliability, performance, compatibility, expandability and Product lifecycle

Rugged computers are designed for use in industrial environments involving harsh, aggressive and dirty conditions. They are intended to be used in difficult conditions and to be able to withstand a wide range of environmental influences.

| Protection against | Protective functions | Rugged computers | Conventional computers |
|---|--|------------------|------------------------|
| Shock, vibration, drops | Numerous special components are fitted to give protection against impacts, drops and strong vibrations. These include tough housing combined with shock absorption and padding of internal components, through to double-soldered component joints on the main board. The display glass is specially hardened to make it far more resistant to cracking or scratches than conventional displays. | ✓ | ✗ |
| Heat and cold | The permissible operating temperature range is significantly extended to ensure reliable operation under very hot conditions and at sub-zero temperatures. | ✓ | ✗ |
| Dust and dirt | Seals in the display and keyboard plus filters in the cooling fan protect against the ingress of dust or dirt, thereby preventing faults in the device and contributing to a longer service life. | ✓ | ✗ |
| Humidity and moisture | Sealing to IP water resistance standards for use in humid environments or in rain or snow. | ✓ | ✗ |
| Electromagnetic interference (EMI) | Electromagnetic interference often occurs in industrial settings and is associated with large machines and motors. Suitable shielding eliminates communication errors caused by EMI between devices and voltage spikes. | ✓ | ✗ |
| Solar radiation and bright light | High brightness and glare-free, anti-reflective treatment of the display interface ensures easy readability even in strong sunlight, either outdoors or in a vehicle. | ✓ | ✗ |
| Problems and errors in operation | Touchscreens are specially designed so that they can be operated while wearing gloves. | ✓ | ✗ |
| Explosion hazard | Devices that are 'intrinsically safe' are designed in such a way that they are guaranteed not to emit sparks. This makes them safe for use in proximity to hazardous materials or flammable gases. | ✓ | ✗ |
| Shortened service life | Products have a stable road map maintaining form factor and footprint to ensure compatibility generation to generation and a long service life. | ✓ | ✗ |

Optimised for use in manufacturing

Industrial computers are much more than simply devices with a robust construction. They are created for specific purposes and offer appropriate features and expansions. Their manufacturers test the systems extensively in accordance with recognised industrial standards and as a rule back these up with certification by an independent body.

To ensure that mobile devices can be used to their full potential in industrial manufacturing, various extensions such as barcode scanners and printers are often connected. Yet the more additional hardware components that are required, the more frequently problems can occur such as device failure or reduced run time.

One of the advantages of rugged computers is that they are designed from the ground up to work optimally with integrated and/or peripheral components and accessories, which is a vital consideration in a business setting. Industrial computers often include barcode and RFID scanners, numeric keyboards, GPS, WWAN and other communications interfaces, as well as colour cameras (which can be deactivated).

Ease of operation is a decisive factor in ensuring high productivity under the given usage conditions. Rugged tablets and notebooks feature special displays with optimised touch control designed to permit use even while wearing gloves. At the same time, they support additional entry devices such as capacitive pens to ensure the accuracy of data entry. Ease of operation also extends to robust transportability, for example by means of a special handle. Some types also support one-hand operation.

For extended mobile use, independence from external power sources can also be decisive. As a result, rugged computers tend to feature a long battery life.

Advantages of rugged tablets and notebooks for industrial manufacturing

- **Toughness of construction:** Rugged tablets and notebooks can survive a fall of up to 1.8 metres without damage.
- They are designed to withstand weather-related conditions such as rain, snow, ice, high humidity or dust.
- They allow freedom of movement and can be used without problems even while wearing gloves.
- They offer an optimised user experience under all external conditions, such as strong sunlight or extremes of heat or cold. Devices in this class can be operated in temperatures ranging from -29° to +63° Celsius.
- ATEX-standard certified systems can also be used in potentially explosive environments, such as in painting lines or close to a gas supply. A consumer product would be unthinkable in such a context
- They have an optimal display size for the intended field of use.

Rugged end devices in facility management for compliance and inspections

Carry out safety inspections, update checklists, take photos and send digital reports - all directly on one device without the need for paper documentation. Augmented reality (AR) and mixed reality (MR) technology enables service specialists to guide and support less experienced employees in their teams, remotely and in real time.

Robust displays allow flexible data entry under all conditions

With a digitiser pen, employees are no longer tied to pen and paper when making notes. Similarly, thanks to the built-in cameras, they often do not need to provide descriptions in words. This makes the data easier to store and send, thus supporting the digitisation of your processes.

Scanning and reading in warehouses using mobile devices

Barcode scanners and RFID readers are often required for systems and stock control, both for quality control and to determine the accuracy of shipments. Flexible, rugged computers offer RFID and 1D/2D barcode reader options that help to ensure that all warehouse operations run smoothly.

Tough mobile devices make compliance with regulations easier

Compliance with laws, standards, union agreements and other regulations can be ensured more easily and more dependably using a mobile digital management system. Industrial computers offer numerous connectivity options for this purpose.

Augmented reality (AR) and virtual reality (VR) in mobile applications

Augmented and virtual reality applications offer many advantages for manufacturing by making tasks such as identification of equipment or access to data significantly easier. Industrial computers offer the processing power and connectivity necessary to take advantage of these benefits on site.

What you can expect from modern, powerful rugged computers

In manufacturing and logistics, Industry 4.0 has led to large numbers of two specific classes of device: Tablets and notebooks (laptops). The following overview lists features of the two classes as found in modern devices. It gives an idea of the wealth of solutions with their properties and functions designed specifically for rugged devices.



Rugged tablets

- Impact Resistant, widescreen, high resolution display
- High brightness display ensures readability, even in direct sunlight.
- Various operation modes: by hand, glove or pen. Devices optionally offer a digitisation mode to allow easy access to further information.
- High performance to ensure that all applications run smoothly.
- Windows 10 operating system support.
- Swappable SSD to allow flexible data transfer.

- Robust universal handle.
- Plug-in keyboard with backlighting.
- Retaining straps and belts for various uses.
- Suitable for use in explosive areas; certification to ATEX and IECEx Zone 2/22.¹



Robust laptops and convertibles

- Protection of the device from falls, impacts, vibration, dust and moisture with certification to MIL-STD 810G/H, MIL-STD-461G and up to IP66.
- High performance through modern processors and powerful graphics cards.
- Convertibles can be used as either a notebook or a tablet.
- Peripherals and interfaces:
 - Built-in camera
 - 1D and 2D barcode readers
 - High compatibility with older devices via integrated serial interfaces, such as RS232

- Hot-swap battery technology: replace the battery without the need to close apps or shut down the operating system.
- Optimised connectivity via components for WWAN, GPS, 4G LTE and current WLAN standards.
- Integrated security components:
 - TPM (Trusted Platform Module) 2.0
 - NFC/RFID readers for authentication via near-field or high-frequency transmission
 - Smartcard readers for secure ID identification.
 - Fingerprint scanner.



Always consider the costs across the entire life cycle

In many company divisions, mobile end devices have become a factor in success. Whether for control of production, facility management or warehouse administration, immediate access to data, transfer of information and the possibility of ensuring compliance with processes under all external conditions have become the basis for productivity and business continuity.

Specialised, robust hardware can be considerably more expensive to procure than ordinary consumer

¹ Applicable for all rugged tablets in the market that are certified with ATEX and IECEx Zone 2/22

devices. Yet if the consideration of costs is limited merely to procurement costs, the point could be missed. Such an approach fails to consider either the total cost of ownership (TCO) or the return on investment (ROI).

A variety of studies have demonstrated that rugged devices offer clear advantages in terms of cost/benefit considerations:

- Industrial devices are less prone to defects. Their probability of failure is four times lower than that of conventional devices.
- Rugged computers have a significantly longer service life.
- The reduced failure rates mean fewer unplanned consequential costs, such as production losses or reductions in productivity.

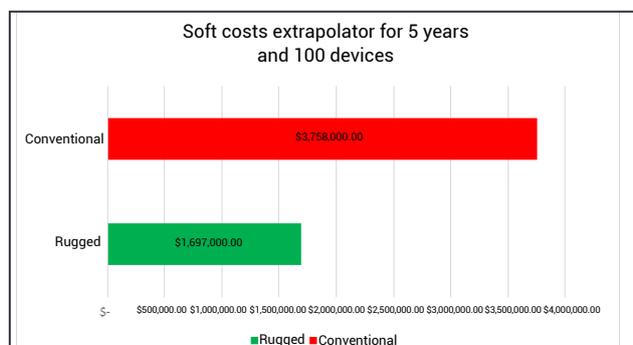
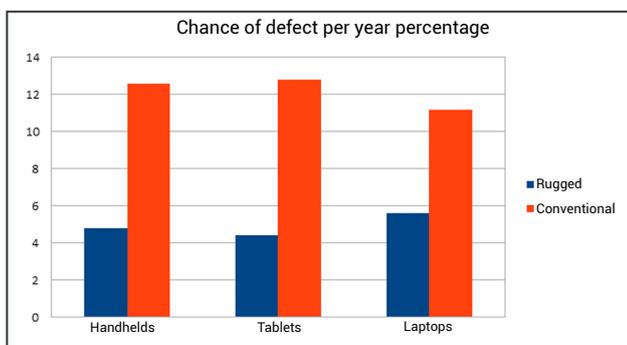
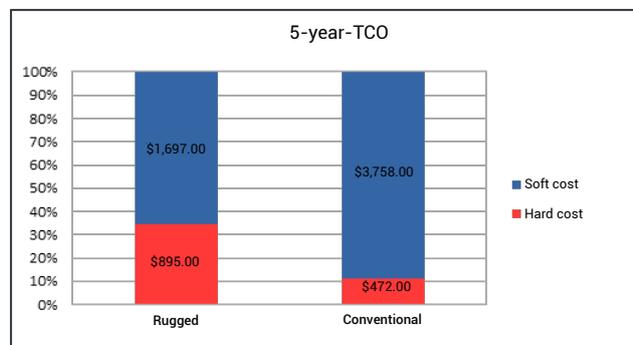
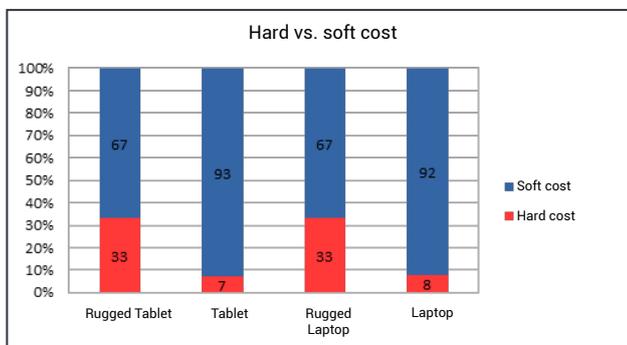
When considering portable computers in terms of TCO, three contributory aspects need to be considered in determining the overall costs:

- 'Hard' costs of acquisition and the provision of hardware, software, implementation, training and so on
- 'Soft' operating costs that arise due to productivity losses, opportunity costs and support costs
- The functionality and associated productivity of the employees

Various studies have shown that the 'hard' costs of end devices in a corporate environment represent only a fraction of the total cost of ownership.

Analysts at VDC found that conventional devices fail up to 2.9 times more often than rugged computers (see graph).

The consequence of this is that the 'soft' costs for conventional devices turn out to be one third higher than those for rugged tablets or laptops (see graph).



Source: VDC Research Group, Inc. Enterprise Mobility, 'Total Cost of Ownership Models for Line of Business Mobile Solutions,' December 2018

Source: VDC Research Group, Inc. | Enterprise Mobility, 'Total Cost of Ownership Models for Line of Business Mobile Solutions,' December 2018

Since the failure of mobile devices impacts negatively on productivity, device reliability is a decisive factor in determining TCO: the higher the failure rate, the higher the TCO or overall cost over the computer's service life.

Taking both hard and soft costs into account, VDC concludes that rugged devices offer a 52.7% lower TCO than conventional computers when calculated over a 5-year period. Based on these facts and figures, the following can be stated: industrial computer solutions are characterised above all by their lower total cost of ownership, due to their lower failure rates, and better return on investment compared to consumer devices. When considered over the longer term, judicious use of robust tablets and notebooks can save significant amounts of money.

Customer service as a productivity and cost factor

Even the toughest computer can still fall victim to a fault, be damaged in an accident or develop software problems. Rapid support, well-targeted assistance for users and speedy return of a device following repair are therefore essential if high productivity is to be guaranteed in day-to-day operations.

To ensure this, the manufacturers of rugged computers provide a level of customer service that offers ever-greater availability. Sophisticated logistics, such as that offered by Taiwanese manufacturer Getac, minimises transit times and takes the burden from the device owner by having the devices packed and collected by the courier and then returned after repair. Digital tracking achieves transparency at each stage and renders written collection documents and dispatch declarations unnecessary.

Since hardware is especially prone in manufacturing to damage from accidents, a comprehensive device warranty is beneficial. Provided that this covers all conceivable warranty claims including accidents, as with Getac's 'Bumper 2 Bumper' warranty, the costs of the device can be minimised throughout its entire service life.

Summary: Taking the long view pays off

Mobile work processes generally require mobile systems that are designed specifically for the tasks involved. To make the right choice of equipment, it is therefore necessary to examine the functions and protective measures required. In doing so, businesses should not only consider the purchase costs of the hardware but should, above all, compare the capability and performance of the 'hard' and 'soft' costs.

If the calculations also include productivity, rugged mobile devices can be seen to offer a significant advantage compared to conventional computers as regards overall operating costs when used in demanding work environments in which they are subjected to dropping, impacts, weather and other potential causes of damage.

The ideal manufacturer will not only supply the appropriate hardware but will also optimise the soft costs by offering rapid, comprehensive service and comprehensive warranty cover.

Rugged mobile devices in action: Case examples of Getac customers

Nestlé Wagner: Digital processes in the food industry*

Nestlé Wagner GmbH produces some 350 million deep-frozen products each year and is thus one of the largest makers of deep-frozen pizza in Europe.



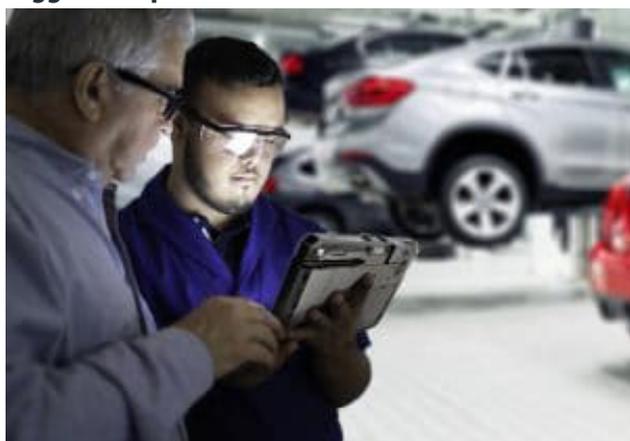
* Source: Getac - Nestlé Wagner success story of 2018

The challenge: To equip production as a whole for the digital future and to further increase efficiency. In the manufacture of frozen foods, foreign bodies must not, under any circumstances, come into contact with the ingredients. With conventional computers, there is the risk that plastic parts may come loose or may fragment if dropped. In this environment, mobile devices are used in various different temperature zones, some of which are extremely cold.

The solution: Thanks to its ruggedness, high quality and performance, the choice was made to opt for the robust Getac A140 tablet with Windows operating system. With its high tolerance range, this device can also be used in the deep-freeze areas with their very low temperatures.

The results: This rugged tablet is used for simple, rapid retrieval of information and for straightforward data recording directly at the site of occurrence; these tasks replace processes that were previously carried out on paper. Given that employees are able to take photos or videos directly on the spot, it is possible to document any difficulties arising on the production line in real time, to communicate them and thus to contribute to their timely resolution.

Industry 4.0 – Leading German car manufacturer optimised digitisation processes thanks to reliable rugged computers*



The challenge: In the fields of research and development, vehicle testing, production, warehouse logistics and workshops, digital processes are being

established worldwide. The specific challenge in cooperating with the Group lay concerned the wide range of planned areas of use. Each of these makes specific demands of the devices.

The solution: Getac supplied rugged tablets and notebooks tailored to the automotive manufacturer's specific requirements. They are used for vehicle diagnostics, in logistics (within the internal warehouse management system), in research and development and in production with the aim of maintaining compliance with Industry 4.0. Of particular importance for the Group are the reliability of these devices, their high processing speeds for handling complex tasks and their immunity to harsh environmental effects.

The results: The automotive manufacturer uses rugged Getac products to optimise parts of its value chain. Getac supplies the devices for this all over the world.

Getac: specialists in robust computer solutions. For Getac solutions, ruggedness is in the genes.

Getac has over 30 years' experience in developing rugged computers. Getac's rugged tablets and notebooks have met the most stringent independent international test standards in terms of ruggedness. What began more than 30 years ago with the highest expectations of the military sector is today a success story across a wide range of industrial fields and sectors. Getac serves a wide range of vertical markets, from transport and industrial manufacturing, military and defence, through law enforcement, public safety, emergency services, utilities, field services and the oil and gas industry through to telecommunications. Getac products are optimised for a wide range of challenges in order to offer suitable rugged laptops and tablets for specific tasks - including the necessary accessories, software and services.

Extensive technical service and customer support:

Technical service includes system integration and compatibility checks with customer applications, joint development of docking solutions, software imaging and customer support.

* Source: Getac Press Release 14th January 2020

Management software available for all Getac devices: To allow centralised management of the end devices, Getac has developed special management software. Administrators can use GDMS to manage and monitor all Getac products from a central dashboard. To ensure high availability, those responsible for IT can view the device status at any time and be automatically informed about any problems arising, as well as about upcoming updates.

Maximum warranty: Getac offers the most comprehensive warranty in the industry for rugged products. It covers a minimum of 3 years and even includes accidental damage. Devices are maintained and repaired at in-house customer centres. For smaller repairs, the 'Self-Maintainer' programme gives customers the option to have replacement parts sent to them directly.

Sophisticated logistics with shortened transit times: The integration of logistics into Getac service centres allows Getac technicians to devote more time to customer devices. This ensures a high quality of repair and, in particular, rapid return delivery. Packing is carried out by the DHL courier; the user only needs to make the device available for collection. All phases are seamlessly tracked online.

Checklist: do I need rugged tablets or notebooks?

- In which environment(s) are the tablets/notebooks to be used?
- For what applications and processes are they to be used?
- What service life is expected of the hardware, i.e. for how long is it expected to remain in use?
- To what external impacts will the portable computers be exposed?
- How much downtime is acceptable?
- To what degree does the work of the employee concerned depend on the availability of the mobile computer?

- Is conformity of the devices to specific standards or certification mandatory?

Checklist: what to look for when selecting devices?

- Level of ruggedness:** Are certificates available for the required protection from dust, moisture, water, cold and heat?
- Operating modes:** Can the tablet or notebook be used in the required modes - using touch, pen or glove?
- Functionality:** Does it satisfy the requirements of the job, e.g. screen size, battery life, screen brightness? Can the battery be changed during operation (hot-swap)?
- Is certification provided for the intended field of use, e.g. in explosive environments?
- Are all necessary safety mechanisms integrated and compatible with their own environment?
- Can the manufacturer provide a figure for the average annual failure rate?
- Are industry-specific solutions available with computers that are appropriately configured or preconfigured for the tasks involved?
- Are solution packages available consisting of mutually compatible hardware, software and accessories? Such packages simplify procurement, management, maintenance and operation.
- Fast repair service. Advantage: minimises downtimes. Online support available 24/7/365.
- Comprehensive, multi-year warranty that also covers accidental damage.
- Delivery to site of use, across Europe.
- Is management software available for the rugged devices?

A brief glossary of mobile computer terms

ATEX/IECEX: Explosion protection guidelines. Applicable to devices designed for use in explosive environments. Unlike IECEX, ATEX only applies to Europe.

Fingerprint scanner: Enables secure login to the device by placing a finger onto the contact surface built into the device.

IP Rating: Internationally standardised classification that rates the degree of protection provided by mechanical casings and electrical enclosures against the intrusion of dust and water. First number stands for dust and second for liquid proofness.

MIL-STD 810G/H: US military standard that specifies the environmental testing conditions for military equipment such as those relating to temperature, humidity and vibration.

MIL-STD-461G: US military standard that specifies the electromagnetic compatibility requirements of products.

Nit: Unit of luminance to express the brightness of computer displays. One nit (nt) is equivalent to one candela (cd) per square metre. End user computers generally offer levels between 250 and 600 cd or nt. The displays of rugged tablets and notebooks, however, offer a higher level of between 600 and 1400 cd/nt.

RS232: Serial interface standard, widely used up until the 2010s.

Drop resistance: The fall height that a system can withstand without damage while in operation.

Stylus/ Digitiser: A digital pen. There are two main types: A digital stylus is an electronic pen that includes circuitry that communicates with the digitiser panel on dual mode multi-touch and digitiser devices and allows highly precise entries. It can therefore also be used in light moisture conditions. The pen records write operations and transfers them to a computer. A capacitive stylus (touch pen) is a pen with a hard tip, used to operate touchscreens.

TPM (Trusted Platform Module) 2.0: A computer chip that expands computer systems to include basic security mechanisms at hardware level. TPM is standardised as an ISO standard worldwide (except China) and is supported and/or implemented by many hardware and software manufacturers.

About Getac

Getac is a key subsidiary of MiTAC-Synnex Group, the third largest computing company in Taiwan. Their products have met the most stringent international test standards in terms of ruggedness.

Since 1989, Getac has been providing rugged computing solutions for demanding professionals in extreme environments. Getac was established as a joint venture with GE Aerospace to supply defence electronic products.

For more information, please visit www.getac.com.