NESPERT CAM

CAM system for true shape nesting and NC programming

NESPERT® CAM is a CAM system, specially designed for true shape nesting and programming of CNC machines for fiber laser, laser, plasma, oxy-fuel, water-jet and other types of cutting of sheet parts.
NESPERT CAM inherits more than 25 years of development of the CAM system Vintech RCAM.

NESPERT CAM can work together with the system for true shape nesting preparation **NESPERT Manager** and with the MES system for management of the true shape nesting production **NESPERT MES.**

NESPERT CAM performs the following:

✓ supports geometry and data in Database of parts by products and production orders,

✓ imports geometry and attributes of parts,

✓ selects a machine, cutting type, plates and material from Technological Datasets,

✓ automatically and interactively nests parts and blocks, nests parts from orders according to priorities,

✓ applies processing technology according the material, the machine and the cutting type,

✓ generates NC programs and processing documents,

✓ calculates the processing time, the prime cost and creates offers.

Configuration

The **NESPERT CAM** bundle includes:

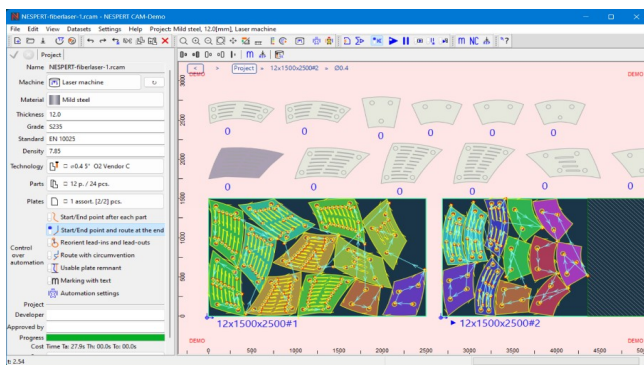✓ NESPERT CAM – CAM system for true shape nesting and NC programming,

Fig.1: Automatic nesting with NESPERT CAM

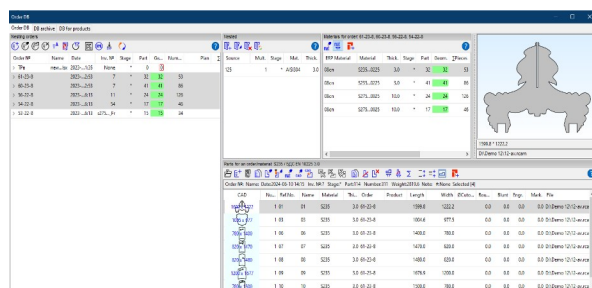✓ DB for nesting orders – single-user DB and a library for parts by clients orders,

Fig. 2: Data Base Nesting Orders in NESPERT CAM

✓ NESPERT NCV – System for verification of NC programs for thermal cutting.

✓ Library NESPERT rSales - Pricing and offering by orders of multi-plate nesting,

✓ Libraries: NESPERT rPipe, NESPERT rAMT, NESPERT rLaser, Parametric parts, NESPERT rJet.

Optional Libraries

✓ NESPERT rBevel – bevel cutting technology.

✓ NESPERT rDrill – Drilling, boring and milling technology.

✓ NESPERT NetDB – Multi-user DB for technological datasets and parts by products and client orders.

Characteristics

NESPERT CAM is 64-bit technological software for Windows 10, 11 or Linux. The CAM system is based on proprietary algorithms for automatic or interactive tight step-by-step nesting with optimisation and **on-line** control against overlapping, without shape or size restrictions of the working area and parts.

Technological datasets

The Technological Datasets (TD) store in a SQL DB settings and parameters for processing, accessible for editing, and parts by products and clients orders.

Nesting Geometry

NESPERT CAM imports geometry from CAD files in the following formats: DXF, DWG*, SVG, ESSI, DSTV, CDW*, FRW*, PSM*; Imports geometry from a Rhino .3DM CAD file.
The input CAD geometry can contain arcs, segments, ellipses, splines, point sets and text.

 * in case the respective CAD system or a universal translating software are installed.

✓ NESPERT CAM corrects geometric defects and marks the locations of the remaining errors while importing.

✓ From the input geometry it automatically defines the contour type of the parts as: outer and inner closed contour, hole, slit, marking geometry, text and point sets.

✓ Automatically recognises separate parts and multi-parts. Imports selected parts from the input geometry, containing CAD Blocks.

Management

NESPERT CAM saves the data during the nesting process in a project file in a folder of the operating system.
To manage the design process the system uses Parts, Blocks, Plates and Nesting layouts galleries, Project navigator, Job, Nesting queue and Project tree.

Plates for nesting in project

NESPERT CAM nests on multiple whole plates and Usable Remnants (UR)

Creating technology at any time

NESPERT CAM offers full-featured instruments for management of the processing technology, defined by cutting paths and route of rapid moves.

A distinctive characteristic of NESPERT CAM is that it can remove or create the Processing technology for the whole layout or for a part of it at any time with on-line control against overlapping.
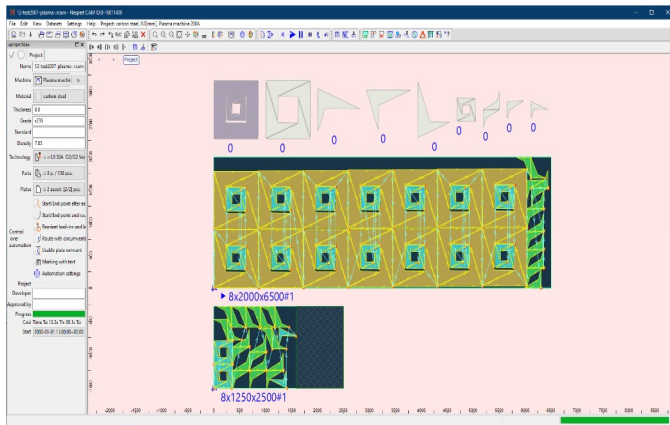

Fig. 3: Blocks gallery (top), Nesting layout with technology (middle), Nesting layout without technology (bottom)

Automatic and interactive nesting

NESPERT CAM nests with high efficiency. It uses algorithms for tight step-by-step nesting with on-line control against overlapping and unlimited part-in-part nesting of parts in holes..

It allows management of the design process, with a random sequence of automatic nesting and interactive functions,

Interactively nests with true shape or in a pattern, controlled by corresponding "handles" for manipulating the selected blocks, always with on-line control against overlapping.

NESPERT CAM works with groups of nested parts – blocks.

Cutting paths and route of rapid moves

NESPERT CAM creates paths automatically or interactively, with on-line control against overlapping, based on information from the Technological Datasets.

The Lead-in/outs of the paths as well as the different types of gaps, bridges, corner processings are path elements. The system finds a location for the path elements using the on-line control against overlapping.

The route of rapid moves defines the sequence of processing the paths in a part and in a nesting layout. The route is generated automatically or interactively according to the nesting level of each part.

NESPERT® CAM allows to interactively set a processing sequence, with the user indicating the next block and the CAM system creating paths and a route.

Generating and editing paths

NESPERT CAM generates paths and path elements, such as: Lead-in/outs; Gaps; Loops, Eyelets, L-locks and others; paths for marking or engraving; paths for accurate cutting of holes; common cut cutting; cutting with bridges;

Interactively changes slope, length and location of Lead in/out or Gap by dragging. Changes the parameters by dragging the relevant „handles". Changes the type of Lead-In and Lead-Out using „halos".

Transferring a nesting layout between machines

NESPERT CAM supports advanced **functions for transfer** of NC programs between different types of machines. Allows automatic change of machine, cutting type, technology, kerf and post-processor in the project or in a separate nesting layout at any time. When the kerf is not changed, the system keeps the paths with common cuts.

Special tasks for true shape nesting

✔ Allows applying "Processing to the material"; Common cut of a "ladder"

✔ common cut snap of parts, nested on a Nesting layout.

✔ avoids collisions by reorientation of Lead-in/outs and automatically circumventing the cut areas with rapid moves,

✔ automatically transforms rapid moves into cutting paths for chain cutting with circumventing,

✔ slices the scrap skeleton,

✔ automatically cuts gaps after the main processing,

✔ creates technologies for processing with repositioning of plates longer than the work stroke of the machine – programming of even or uneven frames,

✔ automatically splits a nesting layout into successive settings for cutting and drilling,

✔ creates nesting layouts only with continuous cutting and lead-in from the plate border,

✔ post-marks – automatically programs the marking of the heat № of the current plate on particular parts from the nesting layout.

Generating NC programs and reports

NESPERT CAM saves reports in HTML, PDF and DXF for nesting layouts and for a project.

NESPERT CAM generates NC programs in ISO / EIA, ESSI, XML LXD and other command systems. It creates NC programs for a selected or for all layouts using Universal or External postprocessor for:

✔ Thermal and jet vertical cutting, vector and jet marking of vectors and texts,

✔ bevel cutting,

✔ cutting with tangential knife or band,

✔ drilling, boring and milling of plane contours with tool change from tool magazine.

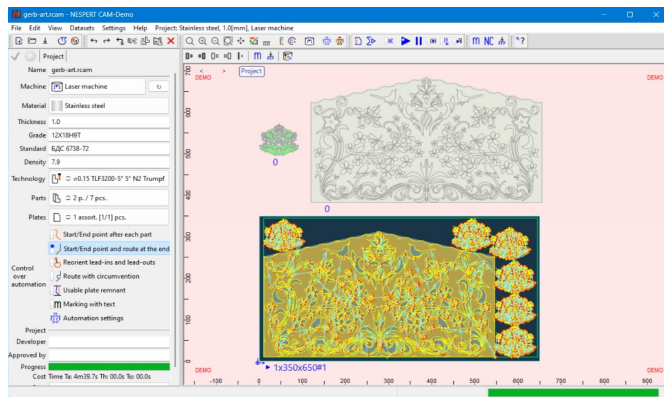# Thermal cutting solutions

Fiber-laser and Laser cutting

Fig.4: Nesting layout of laser cutting and engraving of complex part

NESPERT CAM programs advanced laser and fiber-laser cutting machines with technological tables specific for the type of machine. Creates nesting and cutting technology with a wide range of features for laser processing taking into account the material and contour type and length. It programs cutting, cleaning and engraving. It generates NC programs with rotation and translation of subroutines.

Distinctive characteristics of NESPERT for nesting and programming of fiber-laser machines are:

✓ Works with usable remnants,

✓ takes into account the actual kerf when cutting with a common cut,

✓ cuts matrices of rectangular parts with common cut by "pairs",

✓ manages the preparation of nesting orders,

✓ generates prices and offers by part, layout, project and order.

✓ Programs in XML LXD format for machines with HMI CypCut.

Plasma and oxy-fuel cutting

NESPERT CAM has no restrictions for programming plasma and oxy-fuel cutting machines. It nests and creates cutting technology for plasma cutting of thin metals, and for oxy-fuel or plasma cutting for thick metals.

Programs thermal cutting combined with:

- preliminary dust, percussion, plasma or jet marking of vector geometry with a special tool,
- preliminary or part-by-part marking of texts with text-printing heads,
- preliminary or part-by-part marking/engraving of vector geometry with a plasma cutter.

Programs thermal cutting together with preliminary drilling with sized tool. It drills start holes for piercing, but it does not drill start holes when piercing from the edge or from already cut contour.

Bevel cutting- NESPERT rBevel

NESPERT CAM creates bevelled paths and NC programs for plasma

and oxy-fuel **bevel** cutting through the optional library **NESPERT rBevel**. It programs bevel heads with:

✓ Rotation around the Z axis (4-axis rotator type),

✓ with independent bevel axes (5-axis XYZAB type).

The library creates bevels on whole contours or parts of contours, which can be:

✓ single lower or upper bevel; lower or upper chamfer,

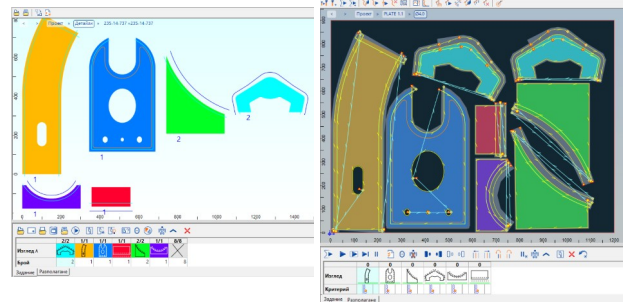✓ complex – Y, К, X bevels,

✓ variable bevels and chamfers,

Fig.5.: Parts gallery (left) and Nesting layout with bevels (right)

It creates bevel paths with technology, according to the capabilities of the CNC machine, the bevel head and the tracking system.

Allows managing adjustable, according to the machines capabilities, Technology Points – setting auxiliary bevel cutting functions.

Allows creating bevel paths for corner processing with loops, with rotation in a point or with sweeping.

Allows defining angular transitions between complex bevel paths, single bevel paths, bevel and vertical paths.

Controls automatically:

✓ The maximum bevel angle of the cutter in inner corners when sweeping

Fig.6.: Part with complex bevels: project

✓ the rotation direction of the rotator when moving along a bevel path.

Provides advanced capabilities for

Fig.7: Test parts

programming the control of dimensional accuracy from the NC program or CNC controller,

Parallel cutting – NESPERT rAMT (Advanced Multi Torch)

NESPERT CAM creates true shape nesting and NC programs for machines with the functionality for changing the number of parallel torches and the distance between them (**A**dvanced **M**ulti **T**orch). Using the module NESPERT rAMT it creates:

✓ Nesting layouts with automatically or interactively nested groups of parts for parallel processing,

- cutting paths and a route of rapid moves,
- visualises and traces parallel processing,
- nesting and technology for multi-torch processing of long parts with parallel edges.

Combined processing – NESPERT rDrill

NESPERT CAM creates technology for drilling, boring and milling combined with thermal cutting using the optional library **NESPERT rDrill**:
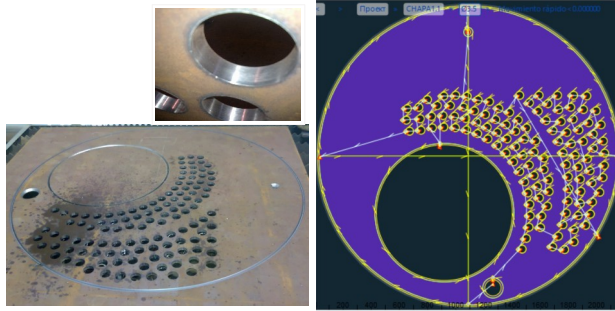

Fig.5: Project (right) and tubular mesh (left) processed with combined plasma bevel cutting and boring of holes

- Defines complex processing of step holes and 2D milling contours on the geometry of flat parts,
- supports drilling, boring and milling tools and the relevant cutting regimes,
- assigns the sequence of the tools in the tool magazine by the NC program,

- creates NC programs for thermal cutting combined with drilling, boring and milling with tool change from the tool magazine.

Pricing and offering

The library NESPERT rSales creates commercial documents and performs pricing and offering:

- for parts and nesting layouts in a NESPERT CAM project

-for parts and nesting layouts in a NESPERT Manager order

The library accurately calculates the spent metal and time based on the program, and distributes them by parts, by layouts, by nesting jobs and for an order. It adds profit or discount and factory expenses in the calculations.
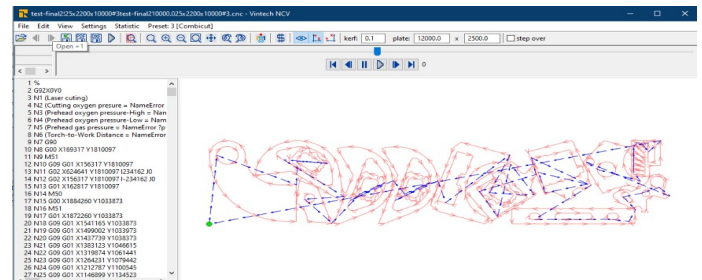
It calculates cost price based on estimates by:

- Length and number of contours or time for processing,
- weight or area of the parts in the order, usable remnants, remnants to order and waste scrap.

It creates commercial documents, with option for adding additional expenses, based on area, contour length, number of round holes, scrap, burn-out etc.

Saves a proforma invoice or offer in SXLS or HTML format and saves a list of plates and usable remnants, nesting layouts, specifications or other types of reports, related to them.

It allows the documents to be generated for sales:

- In national currency, with or without VAT,
- in foreign currency, in multiple languages.

NESPERT NCV

Verifies NC programs and NC program packages for thermal cutting, using the standalone auxiliary program NESPERT NCV.

NESPERT NCV graphically simulates the processing moves of ESSI, ISO / EIA NC, XML LXD programs, and:

- Checks for correspondence between NC commands and the moves of the graphic simulation,
- verifies NC programs with subroutines in absolute or relative coordinates, with translation and / or rotation of the subroutines,
- allows direct editing of the NC programs,
- uses profiles to verify NC programs with different structure and format,
- loads NC programs and NC program packages in the CNC controller via serial DNC interface. Allows management of the DNC interface by the CNC controller (Linatrol, Burny, Mazatrol, Amada, etc.).

- generates cutting programs with post-marking. Uses a post-processor for converting the text data into NC marking code for the specific CNC machine,
- saves the geometry of ISO/ESSI NC programs in AutoCad DXF file format.

VINTECH – Your partner for CNC thermal and jet cutting of sheet material!

VINTECH is the author and the creator of NESPERT® CAM and MES systems, based on IT excellence and more than 44 years of experience in the integration of effective CNC/CAM/MES solutions.

NESPERT CAM - CAM system for true shape nesting and NC programming,
NESPERT Pipe - CAD/CAM system for NC programming of pipe cutting machines,
NESPERT Duct- CAD/CAM system for production of flat patterns of fittings of HVAC systems,
We create software for managing Your future.

NESPERT NCV- Verifier of NC programs for thermal cutting,
NESPERT Manager- CAPP system for management of true shape nesting production,
NESPERT MES - MES system for management of true shape nesting production