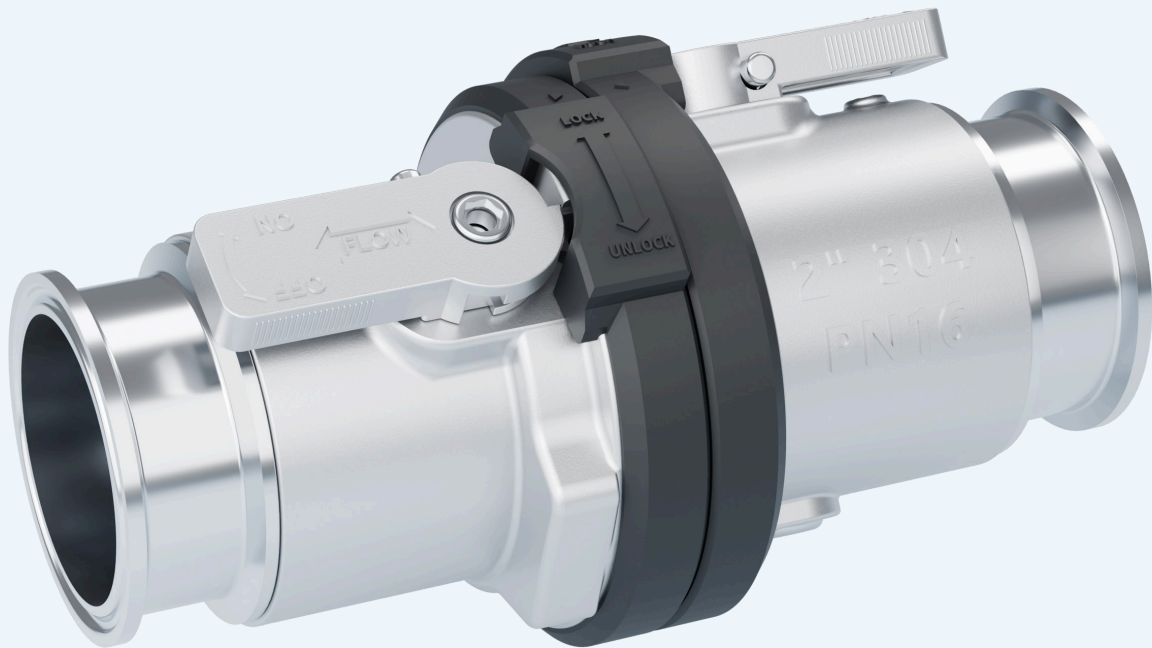


PRECISION FLUID CONNECTIONS

Liquid Cooling Connection Systems



Dry-break interlock. At the core.

Engineering · Investment casting · Machining & assembly · Project validation

Contents

01	Company & system architecture	03-04
02	NP83 dry-break interlock platform	05-10
03	Connection product portfolio	11-15
04	Casting & precision manufacturing	16-19
05	Quality, customization & selection	20-23
06	Contact Nplus	24

One flagship platform. Six connection families.

NP83 leads the portfolio, complemented by EPDM hose, safety clamps, UQD/UQDB, sanitary valves and custom fittings.

01 / COMPANY

Built around precision fluid connections

Nplus develops and manufactures fluid-control and connection components for liquid-cooling infrastructure. Our flagship dry-break interlock platform is supported by hoses, safety clamps, quick disconnects and sanitary components - configured around the application.



Company and production environment



Precision machining area

Application engineering

Start with the fluid, pressure, temperature and interface requirements.

Manufacturing integration

Coordinate investment casting, machining, cleaning and assembly.

Documented delivery

Agree drawings, inspection scope and traceability records for each project.

The connection task defines the configuration.

Supporting AI data centers, HPC / GPU clusters, CDUs, rack manifolds and server liquid-cooling loops.

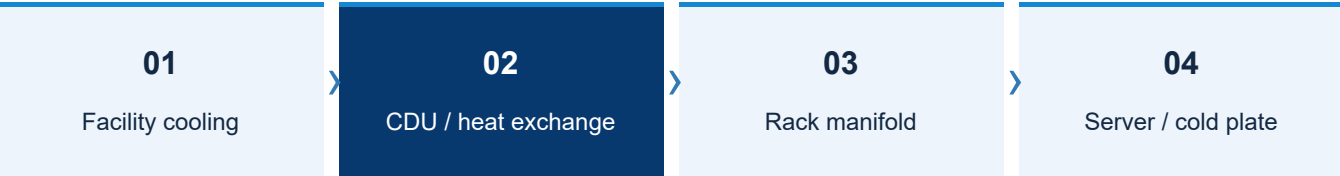
01 / SYSTEM INTEGRATION

One cooling architecture. Defined connection tasks.

Identify the service point first. Then define the isolation, disconnection, hose routing and interface requirements.

Primary and secondary loops meet at the CDU heat exchanger.

The diagram shows where connection products fit; it does not imply direct fluid mixing between the two loops.



Connection task	Product family	Review focus
Mainline service isolation	NP83 dry-break interlock	Isolation sequence, residual pressure, access
Flexible transfer and retention	EPDM hose + RK safety clamp	Bend radius, hose OD, fitting match
Rack and module service	UQD / UQDB	Mating interface, seals, connection state
Branch and custom interfaces	Sanitary valves and fittings	Flow path, installation geometry, cleanliness

Architecture shown for application discussion. The system integrator defines the circuit design, operating safeguards and service isolation.

02 / FLAGSHIP PLATFORM

NP83 Dry-Break Interlock Ball Valve

A connection platform that brings ball-valve isolation and mechanical interlocking together for mainline and serviceable fluid connections.



NP83 connected-state product rendering

16 bar Reference working pressure / 232 psi	NPS 1 / 2 / 3 Reference nominal-size family	EPDM / PTFE Seal configuration options
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Controlled isolation Both valve halves must be closed before unlocking and separation.	Full-flow architecture A direct flow-path concept; flow and pressure-drop data are configuration-specific.	Assembly integration Integrate the valve with the required hose, clamp and end interfaces.
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Product renderings illustrate appearance. Materials, seals and markings are defined by the specific order configuration.

02 / NP83 OPERATING PRINCIPLE

A defined sequence for controlled disconnection



External alignment indicators



Separated state with both valves closed

01 Align and engage

Keep both valves closed. Align the interfaces, rotate to the docking stop and confirm the external indicators.

02 Open in sequence

Press the handle button and rotate one handle 90° to its open stop, then open the other valve.

03 Close both valves

Close one valve, then the other. The connection remains interlocked while either valve is open.

04 Unlock and separate

After both valves are fully closed and system isolation requirements are satisfied, reverse the coupling rotation and separate.

Both valves closed before release. Never force or bypass the interlock.

90° refers to handle travel, not the coupling docking angle. This is an operating-principle overview; follow the approved product instructions and system safety procedure.

Construction and materials for the application



External handle and mechanical interlock features

Component / feature	Reference configuration	Application focus
Body and ferrules	316L	Corrosion resistance, fluid compatibility, material traceability
Linkage	304	Assembly condition and operating fit
Seal system	EPDM / PTFE	Temperature, fluid and concentration
Ball-valve flow path	Full-flow design concept	Review pressure loss at the required flow
External interlock	Close-before-release	Does not replace system pressure management

The table defines reference material options; renderings illustrate appearance only. The approved drawing and order specification define the final BOM, materials and seals.

02 / NP83 TECHNICAL DATA

A clear reference envelope

Metric and U.S. customary reference values support project selection and interface review. They do not replace the pressure-temperature rating for a specific configuration.

Parameter	Reference value	Project confirmation
Working pressure	16 bar / 232 psi	Specific size, material and temperature combination
Assessment pressure	24 bar / 348 psi	Method, medium, hold time and acceptance criteria
Temperature range	-20 to +80°C / -4 to +176°F	Seal option and fluid compatibility
Reference sizes	NPS 1 / 2 / 3	Final bore and connection dimensions per drawing
Body / ferrules	316L	Order material requirements and documentation
Linkage	304	Specific construction and surface requirements
Seals	EPDM / PTFE	Fluid concentration, temperature and cleaning requirements
End connections	Multiple configurations	Interface standard, orientation and installation clearance

Assessment pressure is not a burst rating.

Request or agree model-specific test records, flow coefficients, retained-fluid data and cycle-life validation. Product illustrations are not performance evidence.

02 / NP83 CONFIGURATION

End connections, defined at the interface

Define the mating interface before choosing the end connection. A shared nominal size does not make different interface standards interchangeable.

Clamp-end interfaces

Specify ferrule OD, sealing face, gasket and mating clamp.

Threaded interfaces

Specify thread standard, gender and the intended sealing method.

Hose-barb interfaces

Review hose ID and OD, insertion length and retention hardware.

Custom transitions

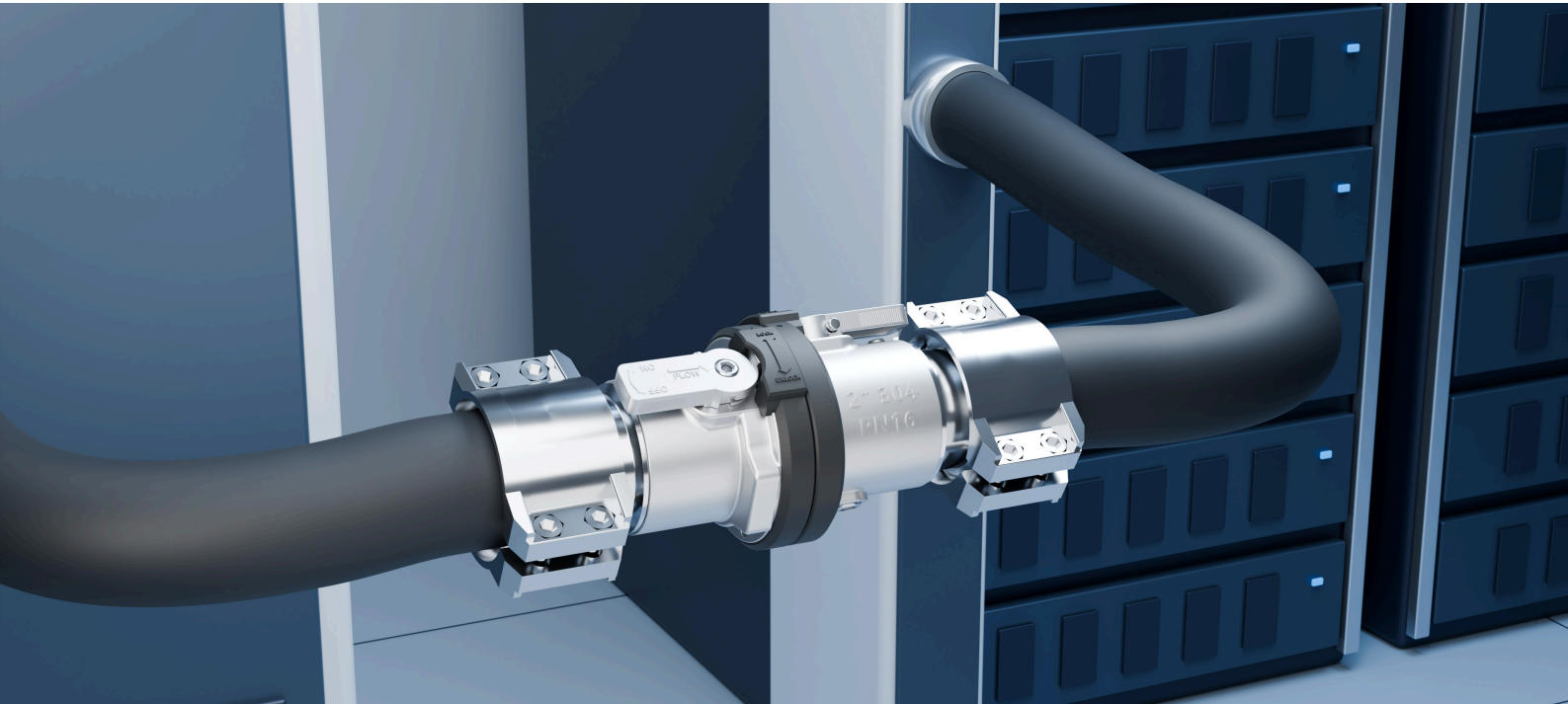
Define transition geometry around the mating component and installation space.

Input to provide	Configuration output
Mating drawing and interface standard	Approved connection drawing and dimensional revision
Fluid, concentration, temperature and pressure	Material and seal selection
Flow, line size and service clearance	Product size and installation arrangement
Inspection, labeling and packing needs	Project acceptance and delivery scope

End-interface names such as NPT, BSPP and ORB require a specific standard, size and approved drawing; they do not constitute an interchangeability claim.

02 / NP83 APPLICATION

Design the connection around the service task



Application rendering with NP83, black EPDM hoses and split bolted clamps

Provide operating access

Allow for handle travel, coupling rotation and separation without structural or cable interference.

Control external loads

Support hoses to limit torsion, transverse loading and excessively tight bends.

Define service isolation

Apply system isolation and residual-pressure controls, with provisions for fluid collection and restart checks.

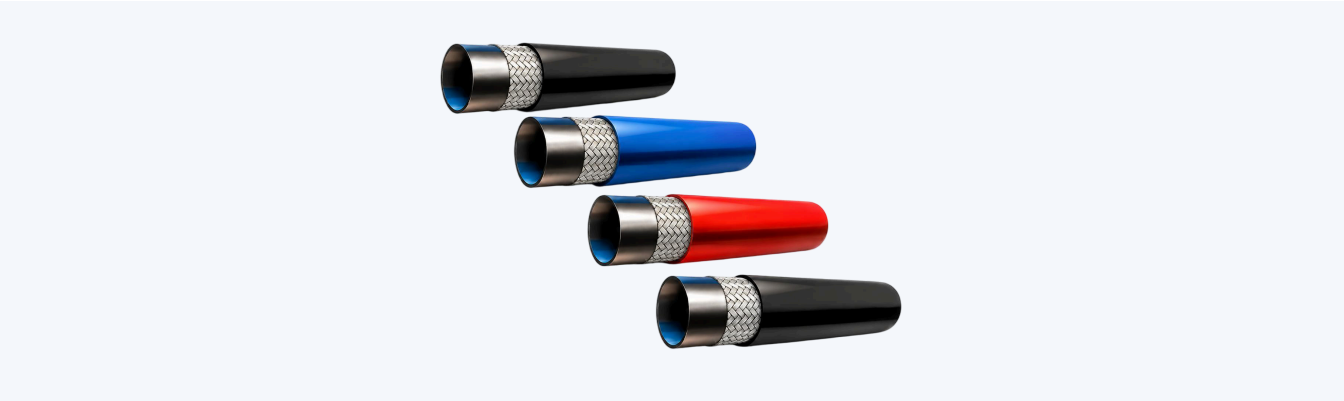
Dry-break service still requires a defined maintenance procedure.

Fluid, temperature, residual pressure and adjacent components determine service conditions. The interlock is not the only required system safeguard.

03 / CONNECTION PORTFOLIO

EPDM Liquid-Cooling Hose

Flexible coolant routing for CDUs, rack manifolds and server loops, with construction and size selected for the service conditions.



NLH-EP series | Hose construction and cover configurations

SELECTION ITEM	REFERENCE CONFIGURATION
Construction	Black peroxide-cured EPDM tube; one fiber braid; synthetic-rubber cover
ID / packaging	1/4-1 in; 600-150 ft reels
Temperature	-40 to +100°C / -40 to +212°F
Pressure reference	150 psi / 10.3 bar; NLH-EP-16: 100 psi / 6.9 bar
Media / vacuum	DI water, water/glycol, air; 15 inHg (-04 to -12)
Cover reference	UL 94 V-0

SIZE-SPECIFIC SELECTION

Confirm ID, OD and available routing space.

MATCH THE ASSEMBLY

Select hose, fitting and clamp as a matched assembly.

DEFINE THE DUTY

Specify coolant, temperature and pressure conditions.

Select working pressure by size. The cover flammability classification is a selection reference; confirm applicable documentation for the model and order requirements.

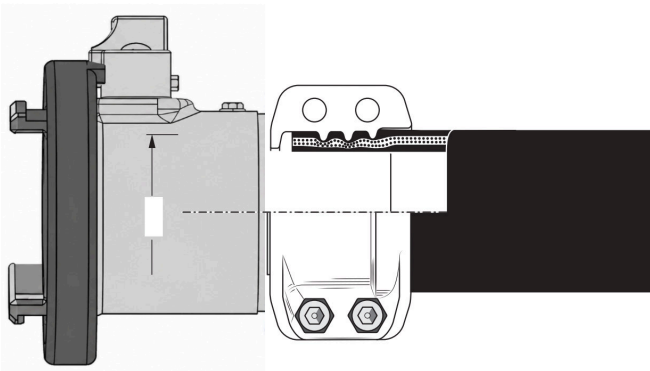
03 / CONNECTION PORTFOLIO

Stainless-Steel Safety Clamps

A controlled mechanical interface between hose and fitting, designed for inspection and service. This portfolio is limited to stainless-steel variants.



NPRK series | Stainless-steel clamps and hose assembly



Assembly interface illustration

SELECTION ITEM	REFERENCE CONFIGURATION
Clamp body	316 stainless-steel reference
Hardware	A2 bolts and nuts
Standard references	EN 14420-3 / DIN 2817
Size range	ND 15-100
Hardware threads	M6 / M8 / M10
ID ring option	Optional polished stainless-steel ID ring

MEASURE HOSE OD	VERIFY THE FITTING	CHECK MATERIALS
Match the clamping range to the measured hose OD.	Check fitting geometry and the clamp interface.	Confirm body material and hardware grade separately.

Confirm suitability for the complete hose, fitting and clamp configuration, not solely from the nominal clamp size.

03 / CONNECTION PORTFOLIO

UQD / UQDB Quick Disconnects

Compact connections for rack branches, module replacement and service interfaces, combining push-to-connect operation, color identification and double shutoff.



UQD / UQDB | Rack and branch connection configurations

SELECTION ITEM	REFERENCE CONFIGURATION
Size framework	Four OCP-referenced sizes
Temperature	5 to 65°C / 41 to 149°F
Pressure reference	Typical 6.9 bar / 100 psi; smaller sizes up to 20 bar / 290 psi
Seal reference	EPDM-P
End options	ORB, BSPP and hose connections
Interface	Push-to-connect; flat-face; double shutoff

SERVICE POINTS

Rack service, module replacement and compact branches.

COLOR IDENTIFICATION

Red/blue sleeves and color-coded O-rings.

CONFIGURATION REVIEW

Confirm size, end connection and seal configuration.

Confirm model-specific applicability of the 20 bar smaller-size reference. OCP-referenced sizing is not a certification or a universal interchangeability claim.

03 / CONNECTION PORTFOLIO

Sanitary Butterfly and Ball Valves

Sanitary butterfly and ball valves extend the cooling portfolio with clean-flow isolation, serviceable interfaces and application-specific end configurations.



Sanitary valves | Butterfly and ball valve portfolio

SELECTION ITEM	REFERENCE CONFIGURATION
Working pressure	16 bar / 232 psi
Assessment pressure	24 bar / 348 psi
Temperature	-20 to +80°C / -4 to +176°F
Bore reference	NPS 1 / 2 / 3
End configurations	Clamp, welded, threaded and application-specific ends

VALVE SELECTION	INTERFACE DEFINITION	SEAL REVIEW
Choose the valve type for the isolation duty and installation.	Define bore, ends and mating components.	Review seals against the coolant and temperature.

These are selection reference limits; not every configuration achieves all limits simultaneously. The 24 bar assessment basis is not an individual product test record.

03 / CONNECTION PORTFOLIO

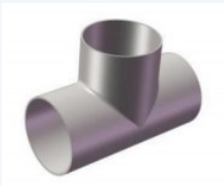
Sanitary Fittings and Custom Cooling Interfaces

From sanitary fittings to hose adapters and custom transitions, define the tube size, connection, seal and finish around the cooling interface.



Tube, ferrule, clamp and gasket interface

INTERFACE BUILDING BLOCKS



Tee



Reducer

45° short and long elbows, 90° elbows, tees, reducers, hose adapters and union assemblies.

SELECTION ITEM	REFERENCE CONFIGURATION
Family references	3A / 45° / BPE / ISO / DIN
Custom interface	Tube OD, end connection, seal and finish
Cooling integration	EPDM hose, UQD / UQDB and dry-break interlock valves
Delivery scope	Drawings, samples, inspection and traceability requirements

DEFINE

Confirm mating interfaces and installation dimensions.

VERIFY

Review configuration through drawings and samples.

DELIVER

Agree on inspection and documentation requirements.

Family designations support product and interface selection; they are not claims of 3-A, BPE or other third-party certification. Approved drawings govern final dimensions and requirements.

04 / MANUFACTURING

Precision starts before machining

From internal-passage formation to final assembly, Nplus connects casting equipment, precision machining and interface engineering around the drawing and application requirements.



Robotic shell-building line



Precision machining and component production

From material formation to connection function



Internal geometry

Water-soluble cores and casting equipment support internal passages and complex forms.

Critical interfaces

Subsequent machining establishes sealing faces, threads and assembly dimensions.

Assembly fit

Verify the assembled relationship of bodies, seals, hardware and mating interfaces.

Equipment supports the process. The drawing defines the part.

Define the material, drawing revision, critical dimensions, finish and acceptance requirements as an actionable manufacturing and inspection scope.

04 / CASTING EQUIPMENT

From soluble core to prepared shell

Investment casting equipment | A coordinated manufacturing platform.

01



16-Ton Dual-Station Water-Soluble Core Molding Machine

Forms water-soluble cores used to create internal passages and other geometries that require removable core features.

02



Automatic Wax Pattern Cleaning System

Cleans wax pattern surfaces before shell building to prepare them for the subsequent coating process.

03



Fully Automated Robotic Shell-Building Line

Applies ceramic shell layers to pattern assemblies through programmed handling and coating operations.

04



Automatically Controlled Dewaxing Autoclave

Removes wax from ceramic shells using a controlled autoclave cycle, preparing the shells for subsequent thermal processing.

Focus: geometry preparation and shell condition

Review core and pattern geometry, surface preparation, coating and drying, and shell condition after dewaxing before casting.

04 / CASTING EQUIPMENT

From casting to surface preparation

Investment casting equipment | A coordinated manufacturing platform.



Automated Shell Firing, Melting & Pouring

Supports coordinated shell heating and metal-handling operations for the conversion of prepared molds into cast components.



Automatically Controlled Dual-Chamber Firing Furnace

Provides controlled thermal cycles for ceramic shell firing and preparation before casting.



Dual-Chamber Automatic Shell Knockout Machine

Removes ceramic shell material from cast assemblies as part of the post-casting cleaning sequence.



Five-Chamber Rotary Shot-Blasting Machine

Cleans casting surfaces through controlled abrasive blasting before subsequent finishing and inspection.

Focus: thermal coordination and surface cleaning

Coordinate firing and pouring through the approved process. Shell knockout and blasting prepare castings for subsequent machining and drawing-specific finishing.

Precision where the components meet



Machining production area

Turning a casting into an assembly-ready connection component requires machining, cleaning and assembly around the critical dimensions and mating surfaces.

Manufacturing focus	Requirements to define
Datums and interfaces	Drawing revision, datum scheme, threads and end geometry
Sealing and fit	Sealing faces, fit clearances and surface requirements
Cleaning and protection	Burrs, residues, internal cleaning and end protection
Assembly and review	Seal identification, hardware configuration, operation and interface checks

DRAWING-DRIVEN	CONFIGURATION-DEFINED	ASSEMBLY-FOCUSED
Link critical dimensions to defined acceptance criteria.	Keep materials, seals and ends aligned with the order.	Review both individual dimensions and assembled fit.

05 / QUALITY & DOCUMENTATION

Define requirements. Verify the evidence.

Define the inspection scope and acceptance criteria before production. At delivery, connect product configuration with the relevant records. Quality requirements should identify the model, drawing and production lot.

CONFIGURATION REVIEW

Materials, seals, ends, drawing revision and service conditions.

VERIFICATION SCOPE

Dimensional, material, functional and agreed pressure checks.

TRACEABILITY PLAN

Link part identification, heat or lot numbers and inspection records.

SHIPMENT RELEASE

Identification, packing, accompanying records and customer review points.

Specify the documentation package

Document	Scope to agree
Approved product drawing	Dimensions, materials, seals and interface revision
Material documentation	Grade, heat/lot and product linkage requirements
Inspection records	Items, methods, sampling and acceptance criteria
Pressure / leakage records	Configuration, medium, pressure, duration and result
Release documents	Packing list, labeling and agreed quality records

Documentation, testing and witness scope are subject to written project agreement. Product renderings and equipment photographs do not replace qualification records.

05 / CUSTOM ENGINEERING

From application need to defined connection

Start with the interface challenge. Translate the system boundaries into a product drawing, sample and agreed delivery requirements.

01 Application definition

Provide fluid, pressure, temperature, flow and service conditions to define the connection task.

02 Interface and configuration

Confirm mating parts, standards, materials, seals, installation dimensions and finish.

03 Drawing and sample review

Approve the drawing revision and review sample fit, operation and system integration.

04 Verification plan

Define dimensional, functional, pressure or other applicable checks for the project.

05 Manufacturing and release

Manufacture to the agreed configuration and supply the specified records, packing and identification.

Customization begins with a controlled interface.

Confirm end transitions, installation length, materials and seal options in the drawing or technical agreement.

05 / SELECTION MATRIX

A practical guide to the portfolio

Choose the product family by connection task, then verify pressure, temperature, materials and interfaces for the actual configuration.

Product family	Primary task	Selection input
NP83 dry-break interlock	Mainline isolation and service disconnection	Size, isolation sequence, fluid and service clearance
EPDM liquid-cooling hose	Flexible routing and coolant transfer	ID/OD, bend radius, temperature and ends
RK stainless-steel clamp	Mechanical hose-to-fitting retention	Hose OD, fitting profile and hardware
UQD / UQDB	Compact branch and module service	Mating interface, size, seals and connection state
Sanitary valves	Circuit isolation and branch control	Valve type, bore, ends and seals
Sanitary and custom fittings	Transitions, branching and custom interfaces	Drawing, tube OD, ends and finish

Select the assembly, not only the component.

The connection envelope depends on the combination of valve, hose, clamp, seal and mating end, as defined in the approved assembly configuration.

05 / PROJECT INQUIRY

Build a better application brief

A complete application brief reduces clarification cycles and establishes a clearer quotation, configuration and verification scope.

FLUID & CHEMISTRY

Fluid name, concentration, additives and cleaning conditions.

PRESSURE & TEMPERATURE

Normal / maximum pressure, temperature range and transients.

FLOW & LINE GEOMETRY

Required flow, line size, hose ID/OD and available space.

ENDS & MATING PARTS

Interface standard, connection type, drawing or 3D model.

SERVICE & OPERATION

Connection frequency, isolation steps and maintenance access.

DELIVERY & QUALITY

Quantity, samples, material records, inspection and packing.

Send your brief and drawings

manager@nplustech.net

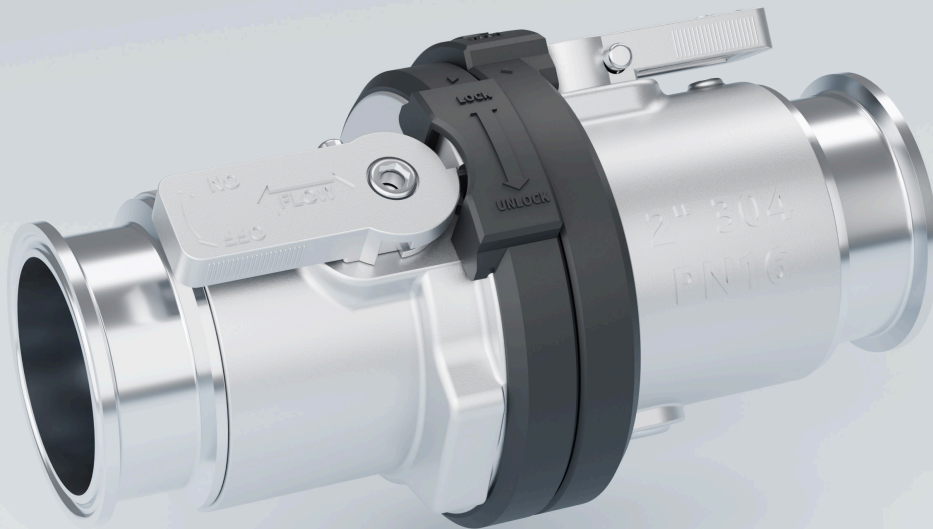
Suggested subject: Project / Product family / Target size

Identify mandatory standards, third-party witnessing or certification requirements at inquiry so they can be reviewed before supply is confirmed.

06 / CONTACT NPLUS

Let's define your next connection

Define the next connection around your cooling system.



WENZHOU NPLUS FLUID CONTROL CO., LTD.

ENGINEERING & SALES

manager@nplustech.net

EXPLORE NPLUS

www.nplusnexus.com

This publication supports company and product selection review. Final supply configuration, ratings, drawings and quality documents are governed by the agreed order specification.