



**Neeltran Inc.®**



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**YOUR POWER SOURCE**

**CUSTOM POWER SUPPLIES,  
TRANSFORMERS, CHOKES & REACTORS**

# NEELTRAN STORY

*Transformers and Power Supplies • Industry Leader since 1973*

Neeltran has become the most reliable supplier of Transformers and Power Supply Systems in the industry. Our engineers, along with our manufacturing team, have the knowledge and ability to meet the special needs of our customers. All power supplies are custom designed to your specifications by our engineering staff and completely fabricated in-house at our manufacturing facility.

Our facilities and experience include:

- Research & Development
- Test Laboratory
- Design Engineering
- Printed Circuit Board Manufacturing
- Steel Cutting Machinery
- Baking Ovens
- Vacuum Pressure Impregnation Tanks
- Coil Winding Equipment
- Painting and Steel Fabrication to manufacture our own enclosures
- Assembly Areas

Industry standards are maintained with our testing equipment assuring that all shipped products meet customer's requirements and specifications. Impulse testing as well as customer specific testing is available upon request.

*We welcome the opportunity to quote your requirements and invite you to tour our facilities.*



**83 KA @ 266 VDC Chlorate  
12 Pulse Transformer/Rectifier**

**Since 1973 Neeltran has been a leading manufacturer of transformers and power supplies.**

*Our general product range is:*

- Dry Type and Water Cooled Transformers:  
5–10,000 KVA (up to 25 KV input)  
(Outputs up to 300 KV and 50 KHZ)
- Oil filled Transformers (Rectifier type only):  
100 KVA to 50 MVA (up to 69 KV input)
- Oil filled high frequency Transformers:  
up to 50 KHZ, 2000 KVA,  
up to 50 KV output
- Cast Coil Transformers: up to 20 MVA  
(up to 35 KV input)
- Chokes and Reactors air or iron:  
up to 25 KV, 20,000 amps
- Power Supplies: 100 A to 500,000 amp  
(AC or DC) 1500 VDC. Special outputs up  
to 300,000 volts AC or DC and high  
frequencies are available.
- Power Factor Correction Systems and  
Harmonic Filters

## WHAT WE DO

**SEND US YOUR SPECS . . .**

email: [neeltran@aol.com](mailto:neeltran@aol.com)

# CUSTOM NEEDS

For over twenty-five years, Neeltran has been the leader in the design and manufacturing of power supplies and transformers. Neeltran has over two hundred thousand units installed in forty countries worldwide, with a 99.99% success rate!

Neeltran is the largest independent manufacturer of High Power Rectifier Systems in the Americas who can build oil filled rectifier transformers up to 50 MVA and High Power Rectifiers. Based on reputation, Neeltran has been sought out to produce reliable units for critical and difficult applications.

Our modern facility allows us to design, build and test our own transformers, PC boards, reactors, cabinets, tanks, power factor correction and thd systems and rectifiers. Depending on our customer's requirements, we can design our units to ANSI, IEEE, IEC, NEMA, UL, CSA, JEC etc. We can also provide a complete PLC system and computer network to interface with our customer's network including SCADA systems.

Our units are operating reliably worldwide, in over 40 countries, in different applications and in very harsh environments. We have worldwide service centers located in USA, Asia, South America, Australia and Europe.



*"My maintenance department loves these units. They are dependable. When routine maintenance is performed, downtime is minimal, Neeltran designed the unit with the customer in mind."*



**18 Pulse Custom DC Power Supply**



**VISIT OUR WEBSITE . . .**

[www.neeltran.com](http://www.neeltran.com)



# MAGNETICS



Cast Coil Transformer

Our dry type transformer product output ranges are:

- 5 KVA to 10,000 KVA dry type up to 24 KV input
- Cast Coil Transformers range up to 20,000 KVA, 34 KV input



Custom Transformers & Reactors

In addition to traditional transformers, we offer specialty magnetics. Neeltran manufactures high frequency and high voltage dry and oil transformers; air and iron core chokes and reactors; drive; and rectifier transformers.



PLC Controls

# HIGH TECH

The introduction of Neeltran's new line of high powered/high voltage switch mode power supply line offers 5000 ADC to 150,000 ADC – up to 2000 VDC.



Switch Mode Supply



Digital Controls



Air Core Reactors

# SERVICE & REPAIR



Test Bay #1

Neeltran is completely equipped to handle both emergency and non-emergency repairs of transformers and power supplies – even the competition's units.

After evaluation of your unit, Neeltran's engineers will electrically and mechanically enhance your unit, even before it is repaired. This provides your repair with a longer life. Spare parts are kept on-hand for repairing all models of units.

Neeltran's Service Department of trained technicians and service engineers are ready to meet your repair needs both at home or across the globe. Trained by Neeltran, service personnel from strategic service alliances with worldwide distributors cover all major continents. These manufacturers in related electrical industries provide same day service worldwide.



Transformer Rewinding

*"I called all over the country to get my transformer repaired. Neeltran was the only company that could take on the job and give me the emergency delivery required. I was facing a \$250,000 cost per day if my backup transformer failed. Neeltran really bailed me out!"*

## EXCELLENCE

Since 1973, Neeltran has designed, manufactured, and serviced its range of power supplies, transformers and specialty magnetics. Total production since 1973 includes over 230,000,000 KW of power supplies and 10,000,000 KVA of transformers.

Neeltran's corporate quality program is CSA certified and audited annually. All of the employees are fully trained to carry forward these quality standards. Audited and certified by ISO 9000 companies, Neeltran's quality program meets the requirements of its customers.

*It is said that a "Neeltran unit is a work of art!"  
You can be confident in the abilities of our engineering and manufacturing teams to provide products to your specifications.*



Nema 4x DC Power Supply

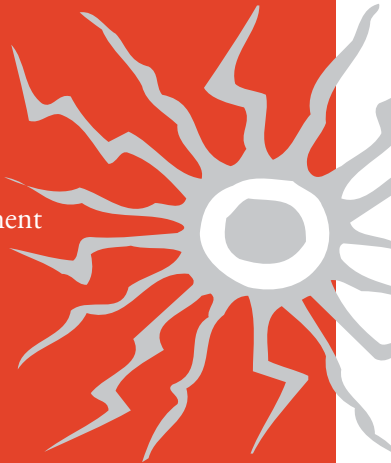
# POWER SUPPLIES

Neeltran has been heavily involved in many DC power supply and transformer contracts with some of the world's largest corporations. To meet our clients' special needs, we offer an unrivaled range of products to suit every type of application.

Neeltran's fully staffed degreed engineering department provides clients with custom units.

Neeltran's products and services play an important role in meeting the needs of many industries:

- Electrochemical
- Electrowinning
- Metal Processing
- Heating
- Laboratories
- Research and Development
- Traction
- Furnace
- Pollution Control
- And More



92 KA @ 192 VDC Chlorate DC Power Supply

Neeltran is a market leader in the supply of 6, 12, 18 and 24 pulse rectification systems. With agencies becoming more and more stringent on harmonic requirements, Neeltran can help customers meet these challenges. We can supply transformers up to 50 MVA.

Our dc power supply product range encompasses 100 ADC power supplies up to 500,000 ADC system.

## RECTIFIER CONTROLS

Neeltran designs and manufactures all of the PC boards and controls used in its High Power Rectifier Systems. We can also integrate PLC's and computers into our control schemes.

## COOLING SYSTEMS

Neeltran can provide any type of cooling system that our customer requires. They range from forced air cooled to liquid cooled.



Cathodic Protection DC Power Supply



40 KAC @ 200 VDC Power Supply for Zinc Extraction



500 ADC @ 1000 VDC High Frequency DC Chopper



# DC POWER SUPPLIES

## APPLICATIONS

Neeltran's power supplies are custom units designed and manufactured for applications such as:

### 1. Traction

- Electric power elevators
- General DC shop power
- Dockside and shipboard
- Mining and other applications
- Municipal transit
- Overhead cranes
- M/G replacement

### 2. Electro-chemical

- Electrolytic waste water treatment and process
- Electro plating
- Anodizing
- Chloride
- Chlorate
- Peroxide
- Oxygen
- Nitrogen
- Manganese dioxide
- Magnesium
- Hypochloride
- Hydrogen



Crane Duty Supply with Regen

### 3. Heating

- Graphite rod heaters
- Process heating

### 4. Metal Processing

- Electro-winning
- Electro magnets
- Furnace
- Power for steel mills
- Synchronous motor excitation
- Mercury arc replacements
- Capacitor foil
- Ion Nitriding
- Plasma Arc
- Gold, Copper, Zinc, Aluminum

### 5. Other Industrial Applications

- Power Factor and Harmonic Filters correction systems
- Testing
- Military
- Equipment and transformer repair

## Regulated and Unregulated Power Supplies

General Specifications  
(\*we will design to your specs)

### Transformers:

Neeltran designs and manufactures its own dry and liquid transformers, reactors, and interphase transformers.

### Dry Type: (VPI) Vacuum Pressure Impregnation

VPI is a process which is a step above the conventional vacuum varnish impregnation. VPI includes pressure in addition to the vacuum, thus assuring good penetration of the varnish coil. The result is improved mechanical strength and electrical properties. With the improved penetration, a void free coil is achieved as well as giving greater mechanical strength. With the superior varnish distribution, the temperature gradient is also reduced and therefore, there is a lower hot spot rise compared to the average rise. In order to receive the best possible electric, thermal, and environmentally protected transformer, you as a buyer should insist on vacuum pressure impregnation system.

# DC POWER SUPPLIES

## Ventilated Dry Type

### Standard Features

- Copper windings (Aluminum optional)
- 180°C or 220°C class insulation. UL recognized insulation system available.
- 150°C temperature rise for operational in ambients of 30°C average, 40°C maximum. 115°C and 80°C rise available.
- Four (4) full capacity taps on H.V. winding, rated 2-1/2 %, 2 FCAN 2FCBN, on all voltages above 600V class.
- Vacuum pressure impregnation with high temperature thermosetting varnish (VPI). (VPE optional).
- Core ground strap.
- Provision for lifting core and coil assembly.
- Thermal overload devices in each coil.
- UL and CSA listed units available upon request.

## Regulated Supplies

### AC Input Voltages:

Up to 24KV (dry) and 69 KV (oil)  
25 to 400Hz

### DC Output Voltages:

Up to 250 Vdc standard, other voltages up to 25,000 VDC available.

### Regulation:

SCR type  $\pm 1/2\%$  voltage regulation.  $\pm 1/2\%$  current regulation with automatic crossover.

### Ripple: (Three phase output)

1 - 6% at full output available.

### Efficiency:

Typically better than 95% when operating near rated output.

### Power Factor:

Typically better than 90% when operated near rated output.

### Overload Ratings:

Per ANSI C 34.2. Industrial Service is standard, 125% for 2 hours, 200% for 10 seconds. Other ratings to heavy traction are available. Thermal protection devices in unit.

### Variable Voltage and Current Output

Solid state controls designed and manufactured by Neeltran offer instantaneous control of voltage from zero to full rating and a wide array of protection systems and devices:

- Peak current overload protection
- Fully isolated feedbacks to 4,000 volts peak
- Built in ramp
- Six LED indicators for diagnostics
- Response time adjust
- 50/60 HZ switch selector (no jumpers involved)
- Computer interface

## Liquid Filled Rectifier Transformers

### Features

- Ratings to 50,000 KVA
- Primary voltage to 69 KV
- 55°C rise, or custom rise available
- Mineral oil filled
- Copper Windings (Aluminum optional)
- Flame retardant liquids available



16 MVA Rectifier Core & Coil

## Unregulated Supplies

### AC Input Voltages:

Up to 24 KV (dry) and 69 KV (oil).  
25 to 400 HZ

### DC Output Voltage:

Up to 250 Vdc, other voltages up to 1,500 VDC available.

### Voltage Regulation:

6% from light to full load.

### Ripple: (Three phase output)

4.5% rms

### Efficiency:

Typically better than 96% at 100% load at rated input voltage.

### Power Factor:

Typically better than 96% at 100% load at rated input voltage.

### Control:

Main transformer is provided with two, 2.5% taps above and below nominal. Other tapping arrangements available.



## Options

### Regulated and Unregulated Power Supplies

#### Transformer:

We will custom design and manufacture the transformer to your specifications and in addition to vacuum pressure impregnation we will epoxy coat your transformer.

#### Cooling Options:

##### Transformer/Unit cooling:

##### Semiconductor/Unit cooling:

- N Class 1: Forced air cooling
- N Class 2: Direct water cooling up to 50 volts DC
- N Class 3: Convection - natural air
- N Class 4: Indirect cooling - air to water on transformer- glycol to water on semiconductor, sealed water cooled
- N Class 5: Indirect cooling- air to water on transformer and semiconductors water cooled
- N Class 6: Indirect cooling- air to glycol on transformer- glycol to water on semiconductor, sealed air cooled
- N Class 7: Air conditioners
- N Class 8: Air to air heat exchangers
- N Class 9: Oil cooled OA
- N Class 10: ONAF
- N Class 11: OFAF

**Other Options:** (Consult factory for more detail)

#### 1. Switchgear (AC/DC)

- AC Contactor or starter
- AC circuit breaker
- AC circuit breaker with under voltage trip
- AC circuit breaker with shunt trip
- DC circuit breaker for output protection

#### 2. More options

- Trigger fuse system
- Regeneration systems  
(continuous, intermittent, tracking, fail safe)
- Primary metering  
(Ammeter, voltmeter, KW, KWH, KVA, P.F., Demand)
- Analog and/or digital metering (High accuracy)
- Anti-single phase protection system
- Reverse current protection
- Under and over - voltage protection
- Input current protection
- Reusable filters
- Disposable filters
- Wall mounting
- Space heaters
- Remote control panels
- Computer control (regulated units)
- Reactor control
- 1% Ripple and other values available

#### 3. Special programming

- Ramp control soft start
- Computer interface
- Isolated signals (Feedback or reference)
- Auto/manual controls



Dual Pump Closed loop Cooling with CPVC Pipe



Custom DC Supply for Water Processing

# DC POWER SUPPLIES

*Examples of our work*



**Military Grade DC Supply for NAVY**



**83 KA 12 pulse Transformer/Rectifier Line-up**



**40 KA @ 200 VDC DC Power Supply, installed in Thailand for Zinc.**



**30 KA @ 233 VDC 12 pulse supply - Bleach Supply**



**15 KA @ 380 VDC Chlorine Supply**

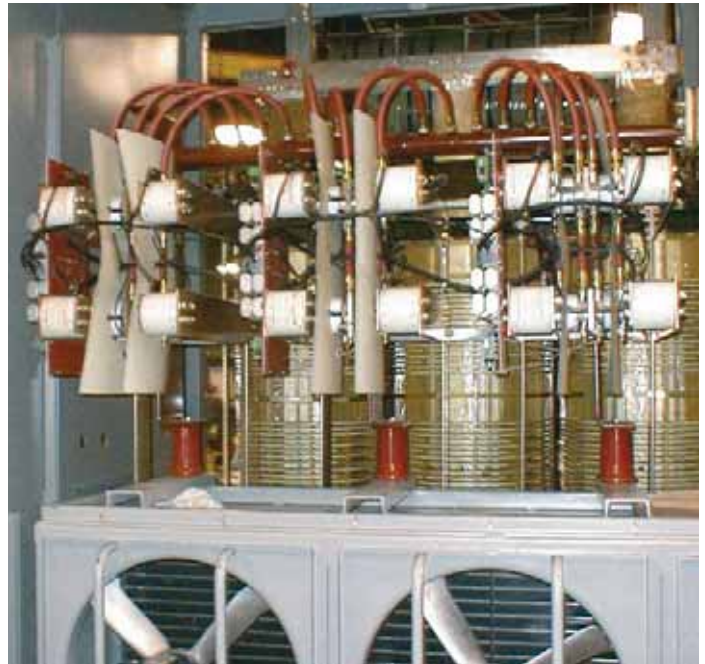


# TRANSFORMERS

## *Power Distribution Transformers*

### Transformer Capabilities and Features

- Indoor or outdoor up to 10,000 KVA, 23 KV, dry type
- 100% copper windings
- 220°C Insulation systems
- UL recognized insulation systems
- 80°C, 115°C, or 150°C temperature rise
- Isolation barriers between high and low voltage sections
- Can include switches (fused or unfused), circuit breakers, and meters
- Pie or disc type windings
- Convection and/or forced air cooled
- Fan cooling option available
- Fan cooling provides 33% additional capacity
- Temperature monitoring and automatic alarm shut off
- Remote control
- Impulse testing available
- High quality core steel



**15 KV Transformer installed in our Rectifier with Closed Loop Cooling**

### Impulse Testing Capabilities

Impulse voltage test demonstrates the strength of an insulation system and its components against impulse voltage. Transformers ranging from 5 to 10,000 KVA can be impulse tested up to 300 KV/600 kilojoules. Test results can be plotted and reviewed by the consumer.

#### Power Packs

- Combined Transformer - Saturable reactor
- Can include metering, remote or local control, switches, breakers, etc.
- Multi-zone furnace applications
- 10 to 2,500 KVA
- Air or water cooled
- Open or enclosed

#### Auto Transformers

- Can be used when isolation between input and output circuits is not required
- WYE or DELTA connected
- Open Delta for motor starting
- 6, 12, 18 and 24 pulse available

#### Phase Changers

- Provides balanced 2 phase loading from 3 phase source
- Can also (with loss of efficiency) provide power to a single phase load without unbalancing the 3 phase line
- Used in furnace and heating applications and motor starting
- 5 to 2,500 KVA
- Air or water cooled

#### High Frequency Transformers

- 25 HZ to 10 KHZ, up to 2000 KVA
- 10 KHZ to 50 KHZ, up to 100 KVA



# TRANSFORMERS



*Standard or Custom Transformers/Industrial Power Supplies*



**Saturable Reactors for Arc Furnace**

## **Saturable Reactors**

- A variable series reactance to provide stepless AC power control
- Constant current to a variable impedance load
- Variable lagging power factor load
- 1 to 3,000 KVA
- Motor speed control
- Air or water cooled
- Open or enclosed

## **Furnace Transformers**

- Multiple ratio outputs for changing resistance loads
- Open Frame or enclosed
- Tap switch, SCR or saturable reactor controlled
- Globar, Moly, arc, carbon and other heating elements
- Single phase, three phase, three or two phase
- Digital or analog metering (Voltage & Current)
- Currents to 20,000 amp
- Air, water, forced air cooled, oil
- 5 to 30,000 KVA



**3200 KVA Furnace Transformer with OLTC**



**1400 KW 12 Pulse Traction Transformer**

## **Traction Duty Transformers**

- Dry, oil or cast
- 500 to 10,000 KVA
- 6, 12, 18 pulse
- Up to 34 KV primary



# TRANSFORMERS

*Standard or Custom Transformers/Industrial Power Supplies*

## Dry Rectifier Transformers

- Single or 3Ø up to 10,000 KVA
- Rectified output voltages up to 50 KV DC, dry type
- Minimum or maximum impedances can be built in
- Induction + dielectric heating generators
- High power modulators, drives
- Designed for crowbar operation
- Air, oil, epoxy, gas, water, or forced air cooling
- See page 15 for oil cooled type



**1500 KW 12 Pulse Traction Transformer at Short Circuit Testing Lab**



**Drive Duty Transformer 24 Pulse**

## Chokes, Inductors, Reactors

- Open or enclosed
- Single or multi phase
- Filter choke for DC power supplies (linear or swinging)
- Charging chokes for pulse forming networks
- Air core or iron core, AC or DC
- Power factor correcting for high capacitive current loading
- Current limiting reactors
- Tapped, multi-winding or variable gap reactors
- Air, gas, oil, or epoxy systems

## Grounding Transformers + Reactors

Sole purpose is to ground the neutral of an otherwise isolated neutral system.

Provides a relatively low independence path to ground, thereby maintaining the system neutral at ground potential.

In the event of a line to ground fault, the grounding transformers allow a fault current to flow which is adequately large enough to cause proper operation of protective relays.

- Air or iron core
- Range 50 KVA- 3,000 KVA
- Voltages up to 34,000 Volts



**DC Supply with Reactor**



# TRANSFORMERS

*Standard or Custom Transformers/Industrial Power Supplies*

## UPS System Main Power Transformers

- Low flux density assures quiet distortion free operation
- M-6 grain oriented silicon cores
- Parallel resonance feature cancels out capacitive load currents
- Dual input (Inverter or Bypass)
- Dual tapped outputs
- 5 KVA 1Ø to 4,000 KVA 3Ø



200 KVA Transformer



83 KA Interphase Transformer



Dual Pump Cooling for Oil-Filled Transformers

## Buck-Boost Auto Transformers

- Low cost alternative for limited voltage range when isolation is not required
- Compensate for high or low line voltages
- Protect equipment against low voltage sources or power company voltage reductions
- Up to ten position range control
- Tap switch options
- Open or enclosed
- 5-5,000 KVA



Auto-Transformer

## Custom High Voltage Power Supplies

- Voltages: 1-125 KV
- Power: 1- 2000 KW
- Current Limiting
- Regulated or unregulated
- Continuous or intermittent duty
- Local or remote control
- Oil or air operation

### Applications

- Capacitor Charging
- Fibre Flocking
- Paint Spraying
- X-ray
- Spectroscopy
- Hipot Testing
- Sputtering
- Precipitators
- Laser Energizers
- Ionizers (Ozone Generation)
- Laboratory Uses
- Electron Beam Welding
- Mineral Separation
- Precious Metal Recovery
- Food Processing
- Ion Implantation
- De Salting



# TRANSFORMERS

## Water Cooled Transformers

### Water Cooled Reactors

- Single phase or three phase
- 25 to 400 HZ
- Currents to 15,000 A
- KVA up to 6,000 KVA



**High Power Water-Cooled Reactor in Arc Furnace Supply**

### Air Core Reactors

- 1 or 3 phase up to
- 22 KV and 125 KV Bil
- 2000 Amps AC, 10,000 ADC, continuous current
- AC or DC
- Enclosed



**15 KV Air Core Reactor**

### Oil Cooled Rectifier Transformers

- Indoor or outdoor up to 50 MVA
- Up to 34.5 KV input
- Low eddy current losses
- Mineral, silicone, or r-temp filled
- Copper windings
- Short circuit braced
- Fan cooling & temperature monitoring available
- Other accessories available



**12 MVA Rectifier-Transformer with Oil to Air Cooling**



**2100 KVA 12 Pulse Core & Oil**

### Shielded And Drive Isolation Transformers

Neeltran manufactures and tests transformers in its own state-of-the-art facilities. We can produce dry type transformers up to at least 7,500 KVA, up to 25 KV class at frequencies down to 25 HZ and up to kilohertz values. The transformer can be housed in our factory produced Nema 1, Nema 12 and Nema 3R enclosures. Neeltran has a U.L. recognized insulation system. This high temperature system is designed to operate at a low temperature for long, energy conservation and overload capability. Neeltran uses only high purity copper. Our VPI varnishing system is a step ahead of conventional vacuum varnish systems. This facility which is 9 feet in diameter includes pressure in addition to the vacuum cycle. This results in improved mechanical strength and electrical properties. Neeltran's dry type transformers are the quietest available and can be used in sensitive areas with complete assurance. A typical customer description of our transformer is: "a work of art."

### Neeltran Drive Isolation Transformers

Drive isolation transformers are required to reduce electrical noises which are characteristic of SCR drives. This type of transformer must be specially designed and manufacture to withstand the high electrical and mechanical stresses inherent in drive systems. Neeltran has the expertise and experience which major drive manufacturers look for in acquiring reliable drive isolation transformers. Neeltran is one of the few manufacturers who has the capability of providing high voltage drive isolation transformers as a standard product. K-Rated, UL and CSA approved transformers available.

### Electrostatic Shield Transformers

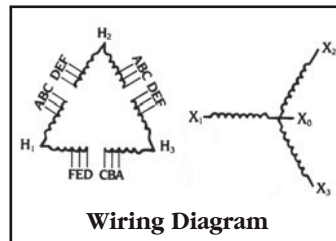
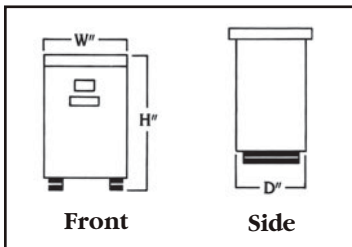
These transformers are used to attenuate electrical noise pollution which can adversely affect computer and sensitive electronics. Neeltran's electrostatic shield transformers have all of the features mentioned above. In addition, we insert a mesh copper shield to attenuate spurious signals. The typical noise rejection is 130 DB common mode and 60 DB transverse mode. Double and triple shielded transformers are available.

*"Our transformers look just as good on the inside, where it counts."*

# TRANSFORMERS



	230Y/133 460Y/266		230Y/133 460Y/266		230Y/133 460Y/266		(lbs.)	Dimensions
3	ISO-001-100	ISO-001-101	ISO-001-102	ISO-001-103	ISO-001-103	ISO-001-105	100	KC
6	ISO-002-100	ISO-002-101	ISO-002-102	ISO-002-103	ISO-002-104	ISO-002-105	130	
7.5	ISO-003-100	ISO-003-101	ISO-003-102	ISO-003-103	ISO-003-104	ISO-003-105	170	2
11	ISO-004-100	ISO-004-101	ISO-004-102	ISO-004-103	ISO-004-104	ISO-004-105	220	
14	ISO-005-100	ISO-005-101	ISO-005-102	ISO-005-103	ISO-005-104	ISO-005-105	220	3
20	ISO-006-100	ISO-006-101	ISO-006-102	ISO-006-103	ISO-006-104	ISO-006-105	260	
27	ISO-007-100	ISO-007-101	ISO-007-102	ISO-007-103	ISO-007-104	ISO-007-105	280	4
34	ISO-008-100	ISO-008-101	ISO-008-102	ISO-008-103	ISO-008-104	ISO-008-105	315	
40	ISO-009-100	ISO-009-101	ISO-009-102	ISO-009-103	ISO-009-104	ISO-009-105	415	
51	ISO-010-100	ISO-010-101	ISO-010-102	ISO-010-103	ISO-010-104	ISO-010-105	470	
63	ISO-011-100	ISO-011-101	ISO-011-102	ISO-011-103	ISO-011-104	ISO-011-105	555	5
75	ISO-012-100	ISO-012-101	ISO-012-102	ISO-012-103	ISO-012-104	ISO-012-105	660	
93	ISO-013-100	ISO-013-101	ISO-013-102	ISO-013-103	ISO-013-104	ISO-013-105	850	6
118	ISO-014-100	ISO-014-101	ISO-014-102	ISO-014-103	ISO-014-104	ISO-014-105	1070	
145	ISO-015-100	ISO-015-101	ISO-015-102	ISO-015-103	ISO-015-104	ISO-015-105	1300	
175	ISO-016-100	ISO-016-101	ISO-016-102	ISO-016-103	ISO-016-104	ISO-016-105	1670	
220	ISO-017-100	ISO-017-101	ISO-017-102	ISO-017-103	ISO-017-104	ISO-017-105	1800	7
275	ISO-018-100	ISO-018-101	ISO-018-102	ISO-018-103	ISO-018-104	ISO-018-105	1950	
330	ISO-019-100	ISO-019-101	ISO-019-102	ISO-019-103	ISO-019-104	ISO-019-105	2200	
440	ISO-020-100	ISO-020-101	ISO-020-102	ISO-020-103	ISO-020-104	ISO-020-105	2800	8
550	ISO-021-100	ISO-021-101	ISO-021-102	ISO-021-103	ISO-021-104	ISO-021-105	3300	
660	ISO-022-100	ISO-022-101	ISO-022-102	ISO-022-103	ISO-022-104	ISO-022-105	4300	9
750	ISO-023-100	ISO-023-101	ISO-023-102	ISO-023-103	ISO-023-104	ISO-023-105	5200	



## Cabinet Size Chart

No.	Dimensions H x W x D (in.)
9	80 x 70 x 42
8	68 x 55 x 40
7	46 x 45 x 28
6	36 x 36 x 22
5	29 x 28 x 18
4	28 x 22 x 16
3	28 x 18 x 16
2	21 x 16 x 14
KC	15 x 14 x 12

\* Chart is based on a copper transformer.  
 \* Custom sizes available.  
 \* For sizes larger than 750 KVA, consult factory.



## VPI DRY TYPE TRANSFORMERS

UP TO 10,000 KVA (34.5 KV CLASS) (VPI) Vacuum Pressure Impregnation

VPI is a process which is a step above the conventional vacuum varnish impregnation. VPI includes pressure in addition to the vacuum, thus assuring good penetration of the varnish in the coil. The result is improved mechanical strength and electrical properties. With the improved penetration, a void free coil is achieved as well as giving greater mechanical strength. With the superior varnish distribution, the temperature gradient is also reduced therefore, there is a lower hot spot rise compared to the average rise.

In order to receive the best possible electric, thermal, and environmentally protected transformer, you as a buyer should insist on vacuum pressure impregnated units. Neeltran is now utilizing a state of the art, 9 foot diameter, vacuum pressure impregnating system.

### Ventilated Dry Type Features Ratings

- Copper windings (Aluminum optional)
- 220°C class insulation, 180°C, UL recognized insulation system available
- 150°C temperature rise for operation in ambients of 30°C average, 40°C maximum
- Four(4) full capacity taps on H.V. winding, rated 2-1/2 %, 2 FCAN 2FCBN, on all voltages above 600V class
- Vacuum-pressure impregnation with high temperature thermosetting varnish (VPI), (VPE-optional).
- Core ground strap
- Provision for lifting core and coil assembly
- Provision for lifting enclosure
- Vibration-isolation pads
- NEMA 1/Rodent proof ventilated enclosure constructed with 12 ga. steel frame and 14 ga. panels
- Removable panels -front and rear
- ANSI 61 gray paint
- Complete production tests in accordance with ANSI C57.12.91

### Neeltran Manufactures Units According to the Following Applicable ANSI Standards:

- C57.12.01 General Requirements for Dry Type Transformers.
- C57.12.50 Requirements for Dry Type Transformers. 1-500 KVA 10 and 15-500 KVA, 30 HV 601-34, 500 V, LV 120-600 V.
- C57.12.51 Requirements for DryType Transformers >500 KVA 30, HV 601-34, 500 V, LV 208Y/120-4160 V.
- C57.12.52 Requirements for Sealed Dry Type Transformers >500 KVA 30, 601-34, 500V, LV 208Y/120-4160 V.
- C57.12.91 Test Code for Dry Type Transformers.

Type	Primary Voltage Class (KV)	Self-Cooled	Fan- <sup>*</sup> Cooled Ventilated Dry	Fan-Cooled Weather Resistant Ventilated
Ventilated Dry and Weather Resistant Ventilated 150°C rise 30°C average ambient		112 1/2	—	—
		150	—	—
	600V	225	—	—
	to	300	—	—
	34.5	500	—	—
		112 1/2	—	—
		150	—	—
		225	—	—
		300	—	—
		500	667	667
		750	1000	1000
		1000	1333	1333
		1000	1333	1333
		1500	2000	2000
		2000	2666	2666
		2500	3333	3333
	3750	4687	4887	
	5000	6250	6250	

### \*Forced Air Cooling (Fan)

Optional forced air cooling is accomplished with fans that increase transformer capacity by 25% to 33 1/3 %, depending on specification requirements and KVA ratings. Forced air cooling is controlled automatically by sensor(s) placed in the LV winding(s). Standard forced air cooling equipment includes fans, control wiring, thermal sensor, and a single-phase electronic temperature monitor.



# TRANSFORMERS



*Table 2 - Standard Dielectric Ratings*

Transformer Type	Voltage Class (KV)	Standard B.I.L. (KV)	Optional B.I.L. (BV)	Standard Impedance (Percent)
Ventilated Dry and Weather Resistant Ventilated	1.2	10	20, 30	5.75
	2.5	20	30, 45	5.75
	5.0	30	45,60	5.75
	8.66	45	60, 95	5.75
	15.0	60	75, 95,110	5.75
	18.0	95	110, 125	5.75
	23.0	110	125, 150	6.25
	27.6	125	150	6.25
	34.5	150	–	6.25

*Table 3 - Audible Sound Levels*

Equivalent Two Winding KVA Self-Cooled	Average Level in Decibels Vent Dry VPI (AA)
101 to 300	58 DB
301 to 500	60 DB
501 to 700	62 DB
701 to 1000	64 DB
1001 to 1500	65 DB
1501 to 2000	66 DB
2001 to 3000	68 DB
3001 to 4000	70 DB
4001 to 5000	71 DB

Equivalent Two Winding KVA Forced Air	Average Level in Decibels Vent Dry VPI (AA/FA)
600 to 1167	67 DB
1168 to 1667	68 DB
1668 to 2000	69 DB
2001 to 3333	71 DB
3334 to 5000	73 DB

*Table 4 - Temperature Rise*

Temperature Rise	Base Rated KVA	150° Rise KVAΔ	Fan Cooled KVA
150°C	1000	1000	1333
115°C	1000	1150	1530
80°C	1000	1350	1800

Neeltran's "VPI" transformers can be constructed with 220°C class insulation and have a maximum temperature rise of 150°C. When ordered with 115°C rise, they have a continuous overload capability of 115% (153% with fans). When ordered with 80°C rise, they have a continuous overload capability of 135% (180% with fans).

# DESIGN WORK EXAMPLE



All Neeltran mechanical designs are done in 3D CAD programs to ensure accuracy, strength and repeatability of product.

## NEELTRAN'S DESIGN EDGE

- Professional staff with a combined industrial experience of 150 years.
- Comprehensive design cycle **unmatched in industry**

<b>Transformers and Inductors</b>	<b>Preliminary Design:</b> Mechanical and electrical conformity, compliance to standards.
	<b>Worst case analysis:</b> Electrical, Environmental, Magnetic forces, Impulse, Structural, Insulation and creepage distance.
	<b>Loss Analysis:</b> Layer-by-layer DC loss, power distortion and harmonics, layer-by-layer losses for each harmonic, skin and proximity effects.
	<b>Thermal Design:</b> Layer-by-layer temperature profile, heat transfer analysis through natural convection or forced air/water/oil.
	<b>Final Design:</b> Manufacturing and Design Verification Test
<b>Customized DC Power Supplies</b>	<b>Preliminary Design:</b> Mechanical and electrical conformity, compliance to standards.
	<b>Worst case analysis:</b> Electrical, Environmental, Magnetic forces, Impulse, Structural, Insulation and creepage distance.
	<b>Harmonics and Power Factor:</b> AC/DC Harmonic spectrum, design of AC/DC filter and harmonic traps.
	<b>Loss Analysis:</b> SCR/IGBT/Diode Losses, Buss-bar and enclosure DC loss and eddy losses at each harmonic.
	<b>Thermal Design:</b> SCR/IGBT/Diode temperature, heat transfer analysis through natural convection or forced air/water/oil.
<b>Final Design:</b> Manufacturing and Design Verification Tests.	



**Neeltran Inc.**<sup>®</sup>  
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[www.neeltran.com](http://www.neeltran.com)

**Transformers and Power Supplies**  
P.O. Box 1659 71 Pickett District Road  
New Milford, Connecticut 06776  
Tel (860) 350-5964 Fax (860) 350-5024