



DENIM BOOK / Creating colors and effects to boost your inspiration





THE ARCHROMA WAY 3

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As a global leader in color and specialty chemicals, we touch and color people's lives every day, everywhere. That is why, at Archroma, we continuously challenge the status quo in the deep belief that we can make our industry sustainable.

We are committed to develop innovative systems and services to provide you with custom solutions that are:



SAFE – It's our nature to protect.
Safe to use, safe to release and safe to wear.

EFFICIENT – It's our nature to rethink sustainable manufacturing.
Innovating application processes that minimize resources and maximize productivity.

ENHANCED – It's our nature to add another level of value.
Effects, functionality and aesthetics to give additional value, for a life enhanced.

We call it "The Archroma way". **Because it's our nature!**





BLUE DENIM / Back & beyond



Denisol® Indigo 30 liq is a pre-reduced indigo solution at 30% concentration, easy to use, allowing high reproducibility and deep shades while reducing impact on wastewater compared to indigo grains.

Denisol® Indigo 30 liq is globally available with two manufacturing plants located in Asia (Pakistan) and America (Mexico).

Denisol® Indigo 30 liq is compliant with major official eco-standards and requirements from retailers, brands and fashion leading companies and helps to produce fabrics suitable for current eco-labeling:



**Denisol® Indigo 30 liq has received the Cradle to Cradle Products Innovation Institute's Gold Level Material Health Certificate.*

ADVANTAGES OF **DENISOL® INDIGO 30 LIQ** COMPARED TO INDIGO POWDER:

Chemicals consumption

Stock vat preparation is not needed, so less sodium hydrosulfite and sodium hydroxide are used.

Sustainability

Reduced impact on wastewater treatment plant (COD, BOD, sulfates/sulphites, total dissolved solids – TDS).

Easy handling

Automated dosing allows a simpler handling process.

Technical benefits

- Increase in productivity, less indigo required to achieve the same depth;
- Better shade consistency and reproducibility, higher color yield achievable;
- Rubbing fastness improving on dark tones

/ UP TO 60%
LESS SODIUM
HYDROSULFITE

/ UP TO 50%
LESS SODIUM
HYDROXIDE

/ UP TO 10%
LESS INDIGO

THE BEST-IN-CLASS AUXILIARIES

Archroma offers the best-in-class specific package of **auxiliaries for indigo dyeing**.

Using Archroma product package, customers can improve the consistency and the workability of the dyeing process, which will result in a high quality level.

OUTSTANDING UNIFORM DYEING APPEARANCE

Primasol® NF liq:

Universal, anionic low foaming padding auxiliary for continuous and semi continuous dyeing processes; wetting and de-aerating agent for dyeing cellulosic fibers and their blends. It increases the liquor pick up, improves the penetration and produces a uniform dyeing appearance.

INCREASING LEVELNESS OF THE DYEING

Setamol® WS p:

Universal, anionic dispersing agent for dyes and protective colloid. It stabilizes the dye dispersion.

LESS STAINING ON INDIGO DYEING MACHINERY

Dekol® SN 100 liq:

Anionic chelating agent and protective colloid with dispersing properties. It is stable over a wide pH and temperature range without losing efficiency. It has a strong complexing action on hardness forming salts and supports less staining formation on the machine during the dyeing process



Break new ground with aniline-free* indigo for denim.

Archroma's new aniline-free* indigo dye, **Denisol® Pure Indigo 30 liq**, reduces risk when producing the traditional, iconic indigo blue that consumers associate with denim and jeans.



ANILINE
FREE*



ØZDHC
COMPLIANT



bluesign®
APPROVED



GOTS
APPROVED



C2C
CERTIFIED**



IMPACT ON
WASTEWATER



PREMIUM
QUALITY



FASHION
EFFECTS

**Denisol® Pure Indigo 30 liq has received the Cradle to Cradle Products Innovation Institute's Gold Level Material Health Certificate.

> Spotlight on [PURE INDIGO FLOW](#), an aniline-free* indigo system that produces authentic denim without compromising our planet

*Below limits of detection according to industry standard test methods

During production, some of the aniline stays locked into the indigo pigment and is difficult to wash off the fabric. The remainder of the aniline impurity, approximately 300 metric tons, is discharged during dyeing. This can be an issue as aniline is toxic to aquatic life. In addition, exposure levels to factory workers can be high.

The toxic chemical is therefore starting to feature on the restricted substance lists (RSL) of some major clothing brands and retailers.

For designers and brand owners who long for authentic indigo inspiration, the new **Denisol® Pure Indigo 30 liq** now also makes it possible to produce indigo-dyed denim without high levels aniline impurities.

From fiber to finish, Archroma offers a scope of possibilities for effects and colors, from the authentic roots of indigo to the most innovative and eco-advanced solutions.

Archroma is a recognized leader in integrated solutions, offering best-in-class auxiliaries for bespoke process packages.



DIRESUL® RDT LIQ dyes are pre-reduced liquid sulfur dyestuffs with minimal sulfide content offering high versatility in application processes and suitable for more ecological dyeing.

These dyes are suitable for bottoming/topping processes offering wide shades in combination with **Denisol® Indigo 30 liq**

-Greenish shiny cast: -

Diresul® Brilliant Green RDT-H liq 150

-Greenish dirty cast:

Diresul® Olive RDT-BW liq 150

-Dirty look:

Diresul® Brown RDT-GN liq

-Dark blue:

Diresul® Blue Black RDT-2B liq

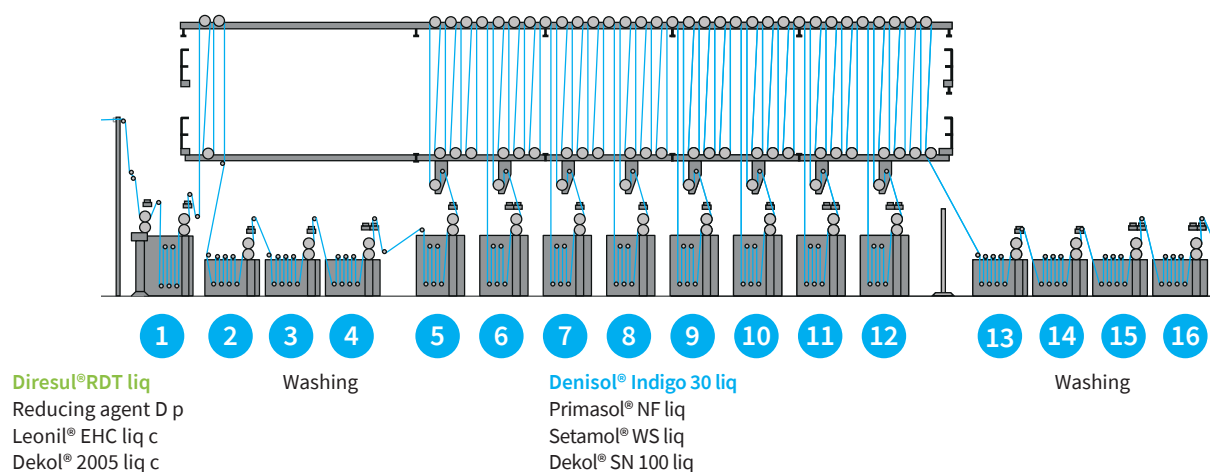
-Reedish blue cast:

Diresul® Arctic Blue RDT liq

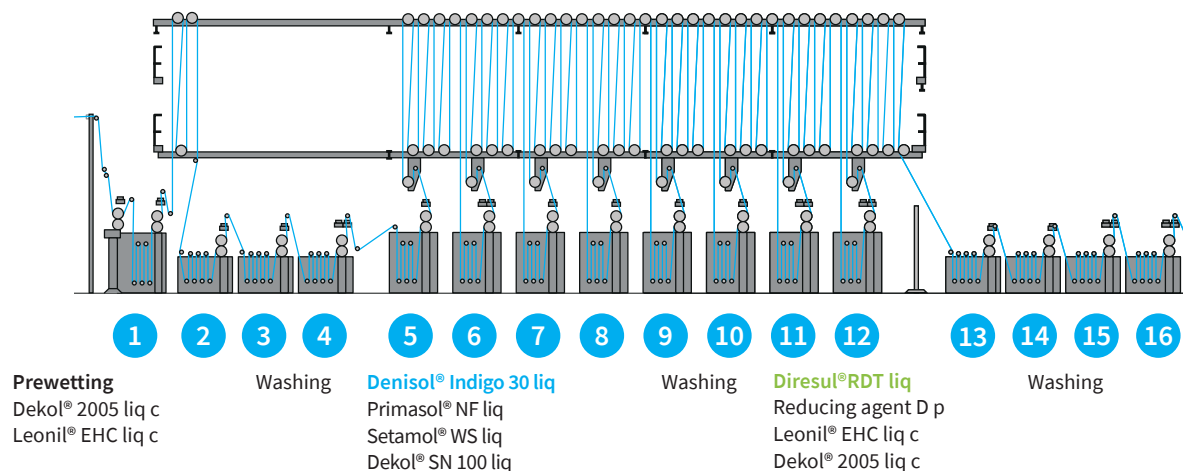
-Special wash-down effects:

Indicolors series & Ocean blues

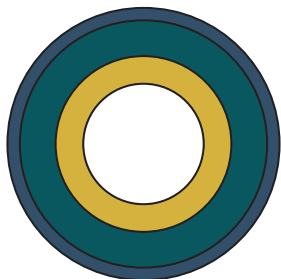
BOTTOMING of indigo with sulfur dyes



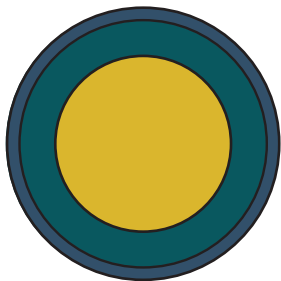
TOPPING of indigo with sulfur dyes



BOTTOMING

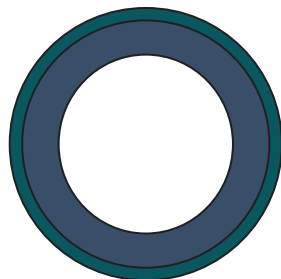


Cotton yarn: non mercerized yarn
 Temperature: medium
 Immersion time: short
 Wetting agent quantity: low
 Steaming: no
 Dye concentration: medium/low

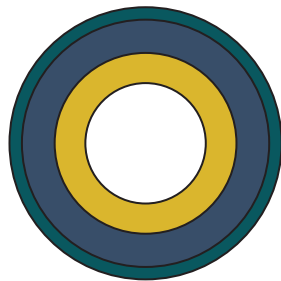


Cotton yarn: non mercerized yarn
 Temperature: high
 Immersion time: long
 Wetting agent quantity: high
 Steaming: recommended
 Dye concentration: medium/high

TOPPING



Cotton yarn: indigo dyed yarn
 Temperature: medium
 Immersion time: standard
 Wetting agent quantity: standard
 Steaming: not required/optional
 Dye concentration: medium/low



Cotton yarn: indigo dyed yarn
 Temperature: high
 Immersion time: long
 Wetting agent quantity: high
 Steaming: not required/optional
 Dye concentration: high

Keys on cross section on a thread pictures

● Yellow sulfur dye Diresul® RDT liq ● Interface indigo - sulfur dye Diresul® RDT liq ● Indigo



1%

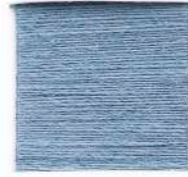
2%

3%

Bleach*

Permanganate*

Denisol® Indigo 30 liq



**50g/l Diresul®
Olive RDT-B liq 150**
Bottoming greenish cast



**50g/l Diresul®
Brown RDT-GN liq**
Bottoming dirty cast



**50g/l Diresul®
Indiblack RDT-2R liq**
Bottoming dark blue

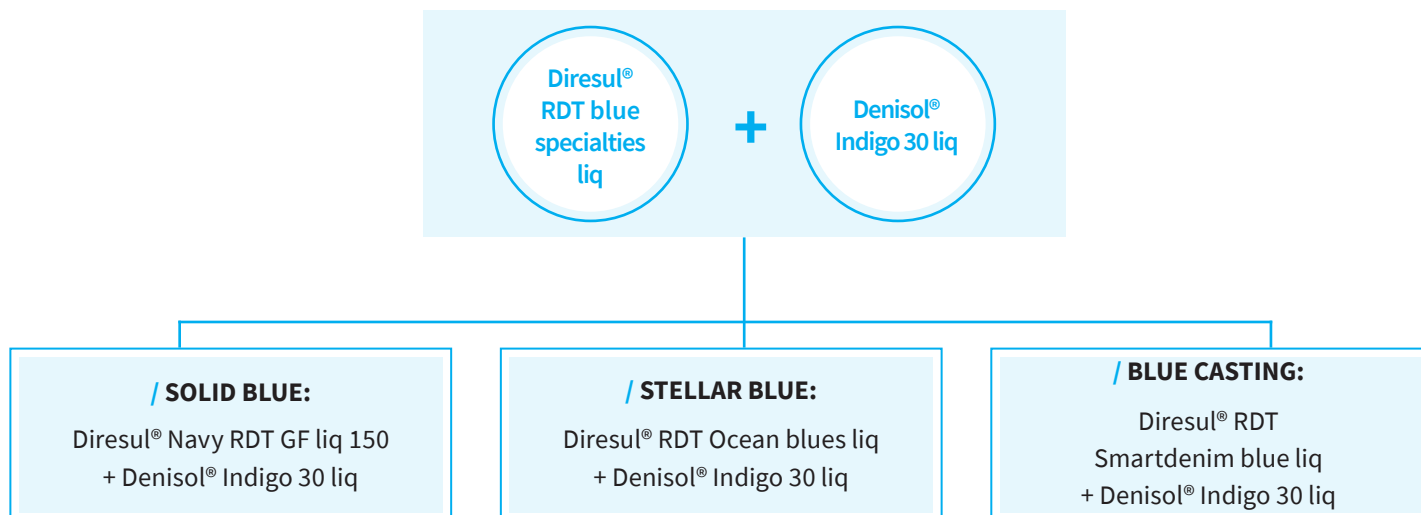


**50g/l Diresul®
Navy RDT GF liq 150**
Bottoming reddish cast



*on the 100g/l dyed yarn

EXCLUSIVE Topping/Bottoming



	1%	2%	3%	Bleach*	Permanganate*
50g/l Diresul® Arctic Blue RDT liq Bottoming bright reddish cast					
50g/l Diresul® Pacific Blue RDT liq Bottoming bright neutral cast					
50g/l Diresul® Caribbean Blue RDT liq Bottoming bright greenish cast					

*on the 100g/l dyed yarn

- **Diresul® RDT selection for minimal staining indigo bath:**

- Diresul® Yellow RDT-E liq
- Diresul® Olive RDT-B liq 150
- Diresul® Olive Yellow RDT-Y liq
- Diresul® Brown RDT-GS liq 150
- Diresul® Brown RDT-R liq
- Diresul® Blue RDT-B liq 150
- Diresul® Navy RDT-2G liq 150

- **Bottoming-Ox process for:**

- Minimal staining of indigo dyebath
- Water saving
- Ring dyeing fixation (for Wash-down look)

- **Selection of colors fast to chemical wash-downs:**

- Diresul® Yellow RDT-E liq
- Diresul® Brilliant Green RDT-H liq
- Diresul® Red RDT-BG liq
- Diresul® Blue RDT-3R 80 liq
- Diresul® Navy RDT- GF 150 liq
- Diresul® Fast Black RDT liq

> Spotlight on [PURE UNDERTONES](#), a sulfur bottoming system that brings a new layer of color creativity to your aniline-free* indigo denim





BLUE DENIM / Revolution in blue



Diresul® RDT blue specialties liq are a selection of Archroma's blue dyestuffs that combine quality with sustainability and enhances the blue jeans's look. They add a vast range of new shades and wash-down effects while allowing high flexibility on application systems, great versatility on final effects and good performance. They are compliant with the major official eco-standards and requirements from retailers, brands and fashion leading companies and help produce fabrics suitable for current eco-labeling.



Archroma's Diresul® RDT blue specialties are based on **Diresul® RDT Indicolors liq, Diresul® RDT Smartdenim blue liq, Diresul® RDT performance blues liq** and, as part of its growing portfolio, a new collection of vibrant, bluish dyes called **Diresul® RDT Ocean blues liq**.

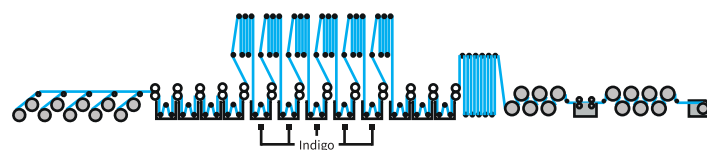
- Warp denim dyeing, using conventional processes and Archroma's ADVANCED DENIM technology.
- Woven dyeing, using pad-steam and the water saving Pad-Ox system, especially designed for distressed look.
- Garment dyeing, recommended in the use of nitrogen atmosphere for eco-advanced application system.

ADVANCED DENIM TECHNOLOGY

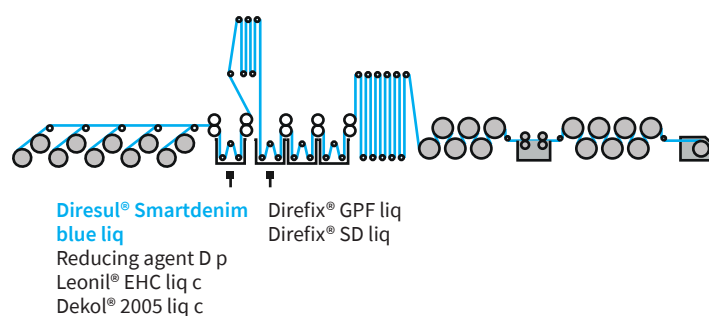
Revolutionizing denim manufacture: we've made it faster, simpler and kinder to the environment

Archroma's ADVANCED DENIM technology brings the benefits of innovative denim dyeing with the responsible use of the Earth's resources.

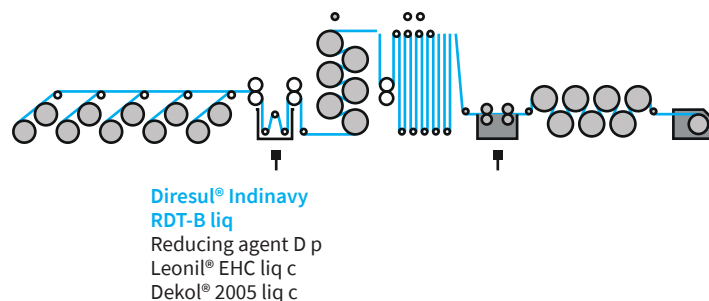
Conventional denim



ADVANCED DENIM Denim-OX process



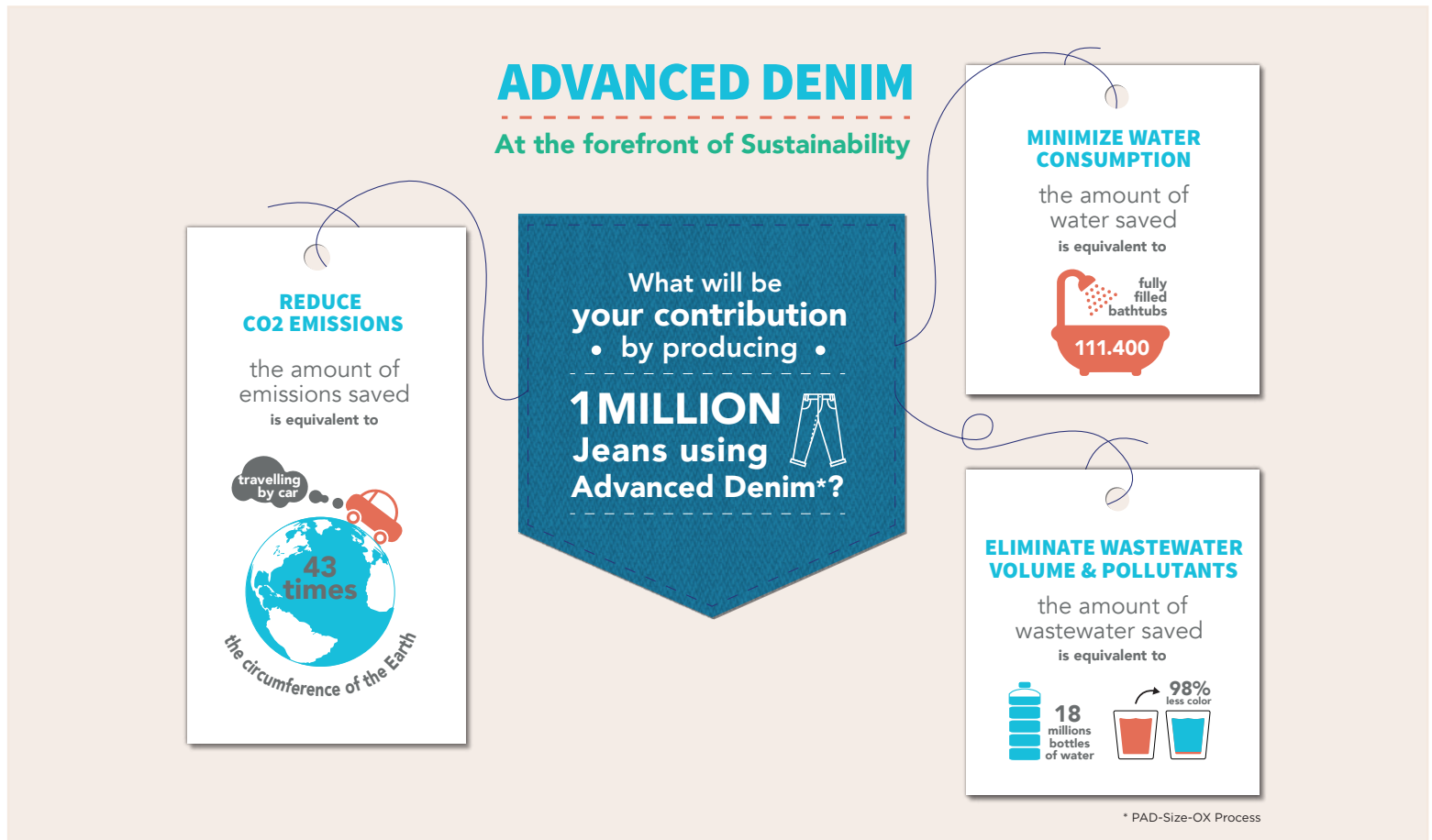
ADVANCED DENIM PAD/Sizing-OX process***



***Pad/Sizing-OX is only recommended for medium shades

AWARDED TECHNOLOGY, CERTIFIED ENVIRONMENTAL BENEFITS

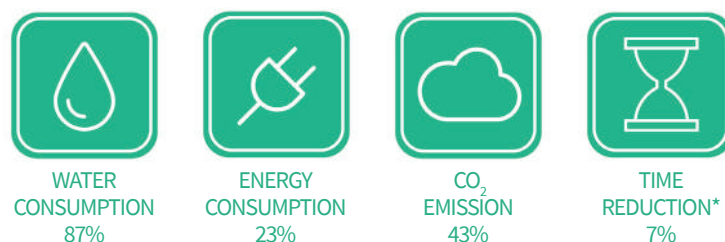
The ADVANCED DENIM technology was honored with the prestigious 2012 ICIS Innovation Award and Innovation with Best Environmental Benefit Award. Archroma was one of the first companies to be awarded a European EU Ecolabel for its illustration collection of jeans in recognition of the sustainability benefits of ADVANCED DENIM.



ONE WAY PROCESS SIMULATOR & CALCULATOR TOOL

The ONE WAY is a tool designed and used by textile processing experts and can provide the user with: accurate process costs, accurate resource utilization (time, energy, water and chemicals), the ability to compare the BOD/COD ratio of effluent discharge flexibility to incorporate RSL/MRSL/accreditation filters.

Archroma's Advanced Denim (Pad/Sizing-Ox) compared to a benchmark indigo dyeing based on blue medium shade:



*considering the length of the machinery

Beyond the classical indigo look































Archroma's **Diresul® RDT Indicolors** and **Smartdenim blue liq** offer a wide range of blue/black/gray tones from one dyeing using different chemical wash-down recipes. They are **suitable for use with the ADVANCED DENIM technology**

- **Diresul® RDT Indicolors** and **Smartdenim blue liq** will enable you to:
 - Obtain a real blue denim look by conventional sulfur dyeing routes
 - Control diffusion of dyestuff for ring/solid effects by different dyeing processes
 - Apply the dyestuffs in bottoming/topping applications
 - Have wide shading flexibility
 - No yellowing effect on pale shades
- Offer a high sustainable denim
 - Minimal water consumption & lowest possible effluent generation (ADVANCED DENIM technology)
 - Sulfur dyestuffs with the lowest sulfide content (Diresul® RDT liq)
 - Sulfide-free* effluents in WTP (Biodegradable reducing agents)
 - AOX-free* garments (Eco-bleach wash-down)

> Spotlight on [▶ INDIGO REFLECTION](#), a coloration system based on Diresul® Smartdenim Blue liq that behaves like indigo, but with a more sustainable and efficient process

*below limits of detection according to industry standard test methods



	50 g/l	100 g/l	150 g/l	Eco-bleach*	Bleach*	Permanganate*
Diresul® Indinavy RDT-B liq						
Diresul® Indiblu RDT-G liq						
Diresul® Indiblu RDT-R liq						
Diresul® Indiblack RDT-2R liq						
Diresul® Smartdenim Blue liq						

*on the 100g/l dyed yarn

Dive into an ocean of new, bright blue colors, inspired by nature, created for you

The new range of vibrant ocean themed blues perfectly suited to be combined with **Archroma's ADVANCED DENIM** technology

- NEW exciting color possibilities for the denim market
- Dyestuffs suitable for both classical and ADVANCED DENIM processes
- Dyestuffs suitable for the most strictest MRSL
- Manufactured in the Archroma Denim Competence Center in Barcelona
- Available to be used as self-shade or in combination with indigo in bottoming/topping processes
- REACH registered

> Spotlight on [DENIM VIBE](#),
a system to efficiently create
bright ocean denim without
wasting an ocean of money
and water

	50 g/l	100 g/l	150 g/l	Eco-bleach*	Bleach*	Permanganate*
Diresul® Arctic Blue RDT liq The bold statement of reedish look						
Diresul® Caribbean Blue RDT liq The greenish tropical look						
Diresul® Pacific Blue RDT liq The wildly neutral look						



















*on the 100g/l dyed yarn

Elegance in all seasons

Dark raw has become a standard effect in denim and sportswear brand collections thanks to its versatility and elegance, which appeals to the consumers. To keep your raw look after repetitive laundries, Archroma offers a selection of Diresul® dyes such as **Diresul® Navy RDT GF liq 150** and **Diresul® Blue RDT 3R liq 80** to be combined with a special application process which allows full diffusion of dyestuffs.

Generally, processes carried out with **Diresul® RDT liq** dyes improve the value of fastness, especially in the case of the dry rubbing fastness test. Both dry and wet fastness could be improved by applying a finishing recipe with a range of recommended products which improve fastness without affecting the final handle of the cloth such as Archroma's state-of-the-art fluorine-free* Smartrepel® Hydro.

> Spotlight on [STAY DARK](#), a complete system for long-lasting, dark navy jeans

	50 g/l	100 g/l	150 g/l	Eco-bleach**	Bleach**	Permanganate**
Diresul® Navy RDT-GF liq 150						
Diresul® Blue RDT 3R liq 80						
Diresul® Blue RDT 2G liq						

*below limits of detection according to industry standard test methods

**on the 100g/l dyed yarn



**BLACK &
GREY DENIM**

Uniting rebellion
& elegance



/ REBEL SHADES BECOMING CLASSICAL

GO TO INDEX

Discover our extensive solutions, from conventional dyes to the most solid and innovative effects

The unique shades and effects created by black sulfur (grey shades, wash down effects, etc) has carved out a niche in the overcrowded blue denim market.

We can distinguish two standard processes of sulfur black.

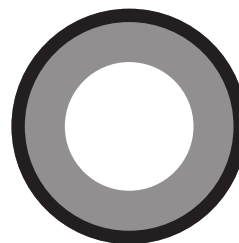
- **Mercerized black denim**

Superficial dyeing effect is obtained for extreme wash-down look

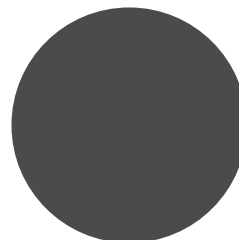
- **Non mercerized black denim**

Solid dyeing effect is obtained for stay black

The diagram on the right shows a section of yarn with its center dyed through the non mercerizing process:



























Cotton yarn: mercerized yarn
Temperature: medium/high
Immersion time: low
Wetting agent quantity: low
Steaming: no
Dye concentration: very high
Process: wet on wet



Cotton yarn: non mercerized yarn
Temperature: high
Immersion time: high
Wetting agent quantity: high
Steaming: yes
Dye concentration: high
Process: dry on wet



Discover our wide range of blacks & greys and effects to combine with Denisol® Indigo 30 liq. We put no limits to quality, sustainability & creativity

	20 g/l	75 g/l	150 g/l	Eco-bleach*	Bleach*	Permanganate*
Diresul® Black RDT-K liq						
Diresul® Blue Black RDT-2B liq						
Diresul® Indiblack RDT-2R liq						
Diresul® Fast Black RDT liq						

*on the 100g/l dyed yarn



COLORS FOR DENIM / Expanding creativity



Discover our wide range of colors and effects

COLOR DENIM PROCESSES

We use the name color denim for all the colors which are dissociated with the traditional blue and black denim.

Dyes used for these types of shades (brown, gray, olive green, etc.) are usually sulfur dyes. It is also possible to use other dye ranges such as reactive or vat dyes, however in this case more complex dyeing installations are required and there are limitations on final effects in garments.

In the area of color denim, such as in the case of black denim, mainly processes of mercerizing and non mercerizing are used.



Discover our wide range of colors and effects to combine with Denisol® Indigo 30 liq. We put no limits to quality, sustainability and creativity

EARTHY & WARM TONES

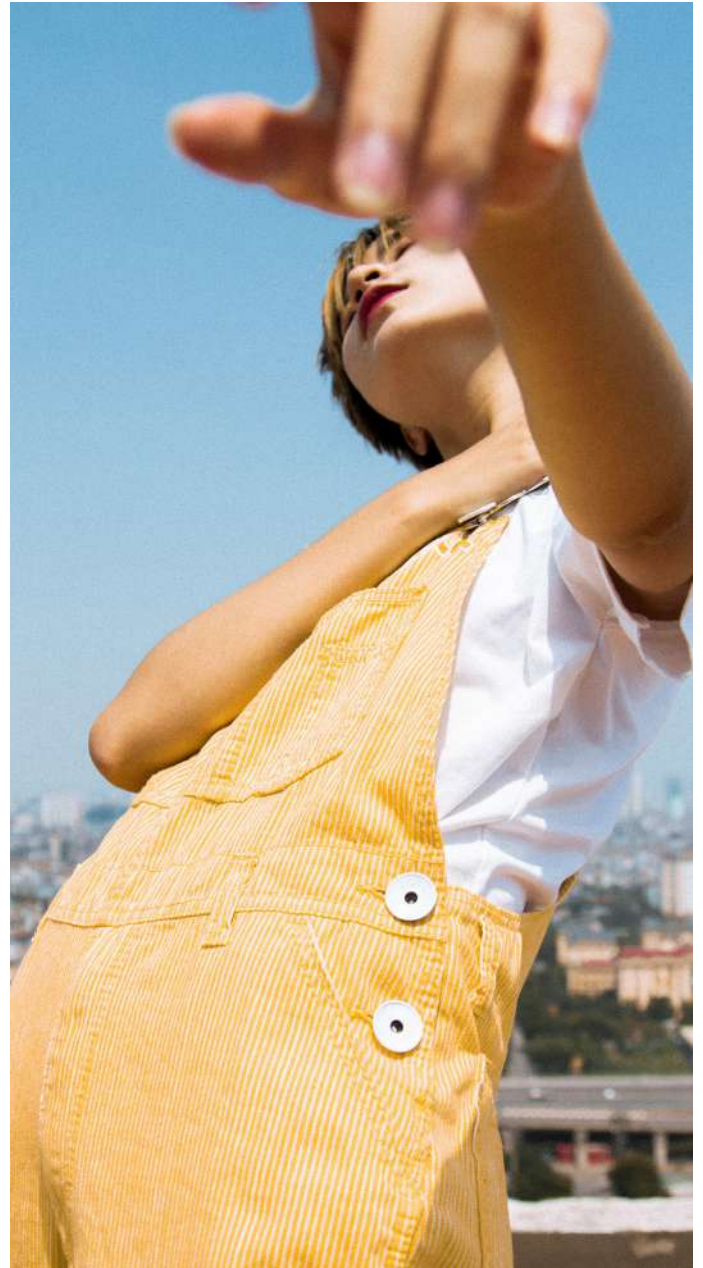
Looking stylish on contemporary workwear silhouettes.

VIBRANT COLORS

Colored denim bright tones emerge as an important trend. Worn head-to-toe fresh tones and impact denim.

MILITARY GREENS & KHAKIS

No longer associated with military service, these natural, mossy tones are embraced for streetwear, menswear and activewear, and are combined with modern military styling.



20 g/l

60 g/l

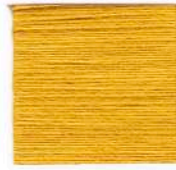
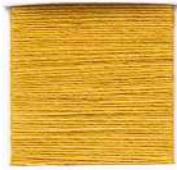
150 g/l

Eco-bleach*

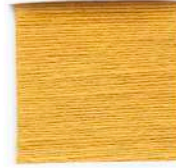
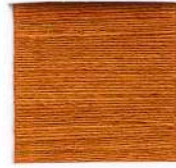
Bleach*

Permanganate*

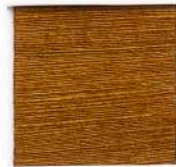
**Diresul®
Yellow
RDT-E liq**



**Diresul®
Orange
RDT-3G liq**



**Diresul®
Olive Yellow
RDT-Y liq**



**Diresul®
Brown
RDT-GN liq**



*on the 100g/l dyed yarn

	20 g/l	60 g/l	150 g/l	Eco-bleach*	Bleach*	Permanganate*
Diresul® Brown RDT-GFW liq						
Diresul® Brown RDT-GS liq 150						
Diresul® Brown RDT-R liq						
Diresul® Bordeaux RDT-6R liq 120						

*on the 100g/l dyed yarn

	20 g/l	60 g/l	150 g/l	Eco-bleach*	Bleach*	Permanganate*
Diresul® Red RDT-BG liq						
Diresul® Brilliant Green RDT-H liq						
Diresul® Green RDT-N liq						
Diresul® Olive RDT-BW liq 150						
Diresul® Olive RDT-B liq 150						

*on the 100g/l dyed yarn

ARCHROMA DENIM PORTFOLIO



1. SPINNING
Reducing friction and ensure high quality level of yarn production

2. PRETREATMENT & DYEING
Best-in-class dyes & auxiliaries

3. SIZING & WEAVING
Ecological & economical products for all types of looms & yarn counts

4. FINISHING
Enhanced denim

5. DESIZING & WASH DOWN EFFECTS
Wash down solutions

Spinning agents

• Afilan®
• Leomin®

Enzymes

• Bactosol®

Anti-staining

• Kieralon® P800 p
• Optimator® HPE liq

3D effects

• Arkofix®
• Perapret®
• Arkophob®
• Appretan®
• Fixapret®
• Catalyst

Color effects

• Diresul® RDT
• Printofix® T
• Drimaren®
• Indosol®

Performance effects

Thermo-control:
• Hydroperm®
• coldblack®
Protection:
• Smartrepel® Hydro
• Nuva® N
• Sanitized®
• NanoSphere®
• Pekoflam®

Care effects

Softeners:
• Ceralube®
• Ceraperm®
• Solusoft®
• Siligen®
• Fixapret®
• Cepreton®
• Leomin®
• Arkofix®
Strength & flexibility:
• Appretan®
• Lurapret®
• Texapret®

Sizing agents

• Arkofil®

Additives

• Trefix®

Blue denim

Colors for denim

Black & grey denim

Dyeing auxiliaries

Revolution in blue

Diresul® RDT blue specialities liq

- Pre-reduced liquid sulfur dyestuffs, low sulfide content
- Suitable for sustainable ADVANCED DENIM technology
- Innovative blues to expand creativity

Diresul® Smartdenim blue liq

- Alternative product to indigo
- Variety of wash-down effects
- Resource saving using ADVANCED DENIM concepts

Indicolors

Beyond classic look:

- Diresul® Indiblack RDT-2R liq
- Diresul® Indinavy RDT-B liq
- Diresul® Indiblu RDT-G liq
- Diresul® Indiblu RDT-R liq

Ocean blues

Exclusive vibrant blues:

- Diresul® Arctic Blue RDT liq
- Diresul® Pacific Blue RDT liq
- Diresul® Caribbean Blue RDT liq

Performance blues

Raw denim, stay navy:

- Diresul® Navy RDT-GF liq 150
- Diresul® Blue RDT-3R liq 80
- Diresul® Blue RDT-2G liq 150

Back & beyond

Denisol® Indigo 30 liq

- Pre-reduced indigo, ready to use liquid solution
- Zero liquid discharge manufacturing plant
- Best-in-class dyeing package

Regular style

Bottoming / Topping:
• Diresul® RDT Blacks liq
• Diresul® RDT Colors liq

Aniline-free* back & beyond

Denisol® Pure Indigo 30 liq

Bottoming / Topping:
• Diresul® RDT Indicolors liq
• Diresul® RDT Ocean blues liq
• Diresul® RDT performance blues liq
• Diresul® Smartdenim blue liq

WIDE & COLORFUL PORTFOLIO

- Earthy & warm tones
- Military & green khakis
- Vibrant colors
- Suitable for bottoming/topping

- Diresul® Yellow RDT-E liq
- Diresul® Orange RDT-3G liq
- Diresul® Olive Yellow RDT-Y liq
- Diresul® Brown RDT-GN liq
- Diresul® Brown RDT-GFW liq
- Diresul® Brown RDT-GS liq 150
- Diresul® Brown RDT-R liq
- Diresul® Red RDT-BG liq
- Diresul® Bordeaux RDT-6R liq 120
- Diresul® Brilliant Green RDT-H liq
- Diresul® Green RDT-N liq
- Diresul® Olive RDT-B liq 150
- Diresul® Olive RDT-BW liq 150

- Rebel shades becoming classical
- Elegant all season
- Stay black
- Superficial black for high contrast
- Broadest gray solution
- Suitable for bottoming/topping

- Diresul® Blue Black RDT-2B liq
- Diresul® Indiblack RDT-2R liq
- Diresul® Black RDT-K liq
- Diresul® Fast Black RDT liq

- Best-in-class auxiliaries for sulfur and indigo dyes
- Improving workability of the dyeing process
- Highest process safety and optimized right-first-time performance

Dispersing agents:
• Setamol® WS p
• Ekalin® F liq

Sequestering agents:
• Dekol® SN 100 liq
• Dekol® 2005 liq c

Wetting agents:
• Primasol® NF liq
• Leonil® EHC liq c

Mercerizing agents:
• Mercerol® QWXL liq

Reducing agents:
• Reducing agent DE liq
• Reducing agent D p
• Rongalit® DNM p

Cationic fixing agents:
• Direfix® SD liq

Peroxide oxidation booster:
• Direfix® GPAN liq

Lubricant agents (Rebeaming):
• Humectol® Denicomb Ro liq





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