| Uniclass | EPIC |
|---|---|
| L3811:P43 | C421:X421 |
| CI/SfB | |
| (21·4) Xh4 | |

comar
ARCHITECTURAL ALUMINIUM SYSTEMS

# comar5

## Energy Efficient Aluminium Window System

**A thermally broken window suite with different profile widths in configurations of: casement, tilt and turn, vertical or horizontal pivot, sliding and top swing reversible.**


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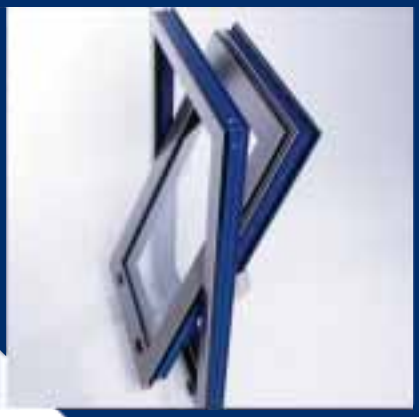


P.i

complementing architecture

Design

Solution

Perform

Deliver

On-time

Sustainable

Quality Assured

comar

Comar Architectural Aluminium Systems is the largest British, privately owned aluminium systems company in Europe.

Comar designs, extrudes and distributes over 700 integrated profiles to a Nationwide approved fabricator network for use in aluminium ground floor treatment, window, door and curtain walling applications.

Comar has built its reputation on delivery. Over £3M of mill, standard white polyester powder coating, silver and bronze anodised profiles are kept in stock. This means that 99% of orders are fulfilled by our customers next weekly delivery. Single and dual colour polyester powder coating can be delivered in 15 working days. For architects and specifiers, a Nationwide team of architectural advisors provide project-by-project advice on design, building regulations, U-value and wind loading calculations as well as NBS specifications, budget pricing and approved fabricators. This service to specifiers ensures that projects run smoothly from concept to installation.

Comar Architectural Aluminium Systems is an ISO 9002 registered company. Comar is a member of the Council for Aluminium in Building, (C.A.B) and is a Technical Committee member. Comar provides CPD seminars to architects and designers through the RIBA CPD network and offers CWCT training courses and seminars through its own Training Centre at Mitcham in Surrey.

Comar is a sponsor member of the C.W.C.T.

Membership with these Associations ensures that customers are kept up-to-date with the very latest in building technology and regulations.

Comar Designed for Performance, Backed by Delivery.

NBS Plus

RIBA CPD Providers Network

CAB Council for Aluminium in Building

Centre for Window and Cladding Technology

# design

## Comar 5 Window System

The Comar 5 aluminium window range is designed to take into account the needs of users of aluminium window systems, now and in the future.

The users are the designing specifiers and architects who care about delivering an aesthetic solution with long term performance, the fabricator who wants systems that are economical, easy to fabricate and delivered on time and, finally, the end user who wants a building that will stand the test of time and provide energy efficiency.

Comar 5 has three high performing suites, ensuring that even the most demanding project can be completed from a single source.

The Comar 5 range includes all window configurations, such as: side-hung, bottom-hung, top-hung, horizontal and vertical pivot, tilt and turn, top-swing reversible and sliding windows. Comar 5 integrates with all Comar products to provide opening vents coupled to doors and opening vents to window walling, curtain walling and ground floor treatment, as well as coupled together to provide ribbon windows.

Comar 5 offers low U-values and is available in 3 profile widths: 45mm, 50mm and 60mm with glazing options from 4mm to 45mm. The 60mm system, Comar 5P.i, is a polyamide system that provides exceptional thermal efficiency for applications where accurate U-value trade-offs are required. Comar 5P.i answers the demands of the latest building regulations by providing enhanced thermal performance, reducing heat loss and maintaining temperatures for longer. This directly impacts on the clients long term use of the building, reducing energy bills. Comar 5P.i also provides a realm of design option with its dual colour option: the internal face and external faces of the profiles can be polyester powder coated or anodised in a multitude of colours and finishes.

Comar 5 can incorporate through frame or glazed-in ventilators from the Comar-Duco range.

Comar 5 offers outstanding weather performance, exceeding the requirements of the very latest weather tightness tests: BS ENs 1026, 1027 & 12211.

## Comar 5 & U-values

Comar 5 offers exceptionally low U-values. Supporting this thermally broken suite is Comar's Technical Department who offer advice to architects, specifiers and fabricators on U-value calculations, wind loading and integration. This service is offered on a project-by-project basis.

## V6

Through our Nationwide network of approved fabricators, Comar supplies V6 estimating software. V6 is a powerful estimating tool; it provides fast, accurate pricing from plans and tenders for the entire Comar product range.

V6 includes the facility to provide section through details which can be exported to CAD so Comar approved fabricators can add detail to Design Drawings.

All approved fabricators are trained in V6, ensuring Comar approved fabricators provide accurate budget pricing and tender returns.

## Research and Development

Comar 5 has been continuously developed to ensure it can be used to complete the most demanding façade. New profiles are regularly introduced. If your project requires new extrusions, Comar's Technical Department will discuss individual projects and develop new profiles to achieve the design brief.

# solution

## Comar 5P.i 60mm Windows

Description

Comar 5P.i are thermally efficient polyamide insulated aluminium windows that offer outstanding weather performance and low u-Values. Profiles are extruded seperately then rolled together with a 20mm polyamide strip offering a dual colour option.

Types

Side-hung, bottom-hung, top-hung, horizontal and vertical pivot, tilt and turn, top-swing reversible and sliding windows.

## Comar 5 50mm Windows

Description

Comar 5 are thermally efficient with a “pour-in-place” resin thermal barrier, incorporating weather performance with durability.

Types

Side-hung, bottom-hung, top-hung, horizontal and vertical pivot, tilt and turn top-swing reversible.

## Comar 5lt 45mm Windows

Description

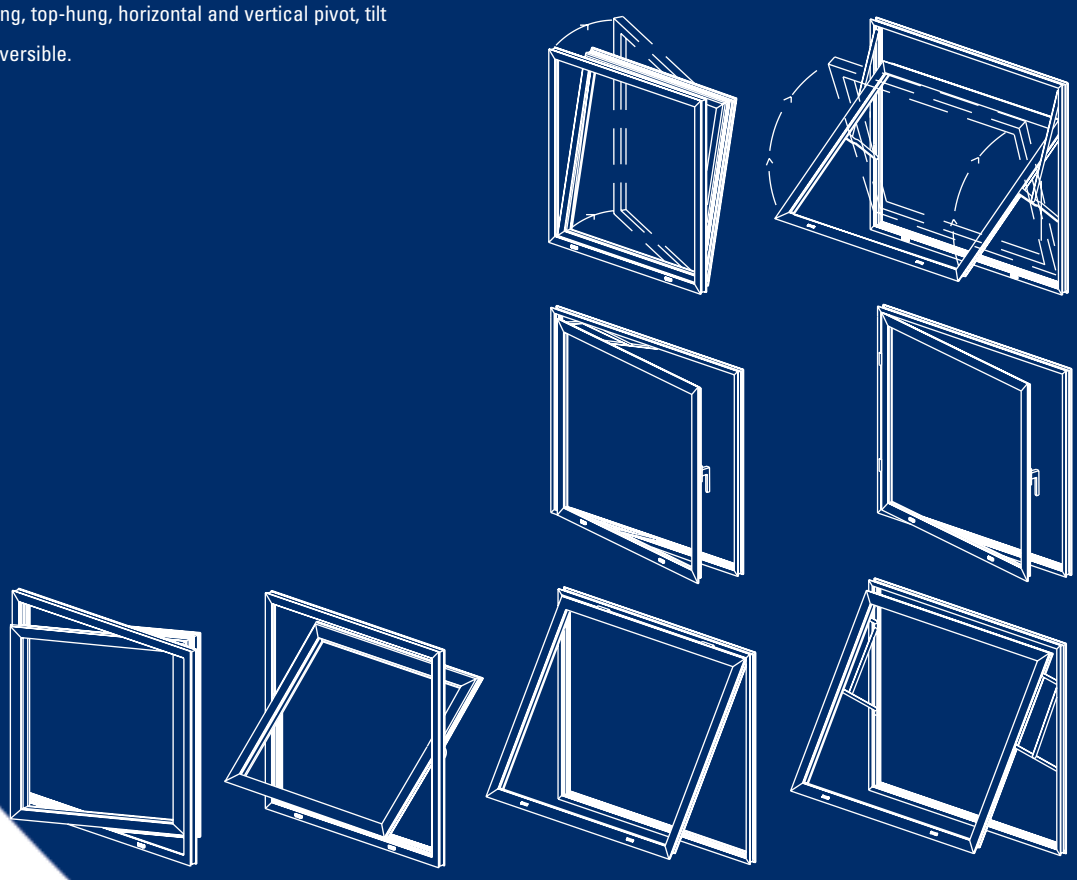
Comar 5lt offers the slimmest sight lines, weather performance and thermal efficiency with a “pour-in-place” resin thermal barrier

Types

Side-hung, bottom-hung, top-hung casement windows.

## Combinations

The Comar 5 range can be installed directly into Comar 6 curtain walling and Comar 2 window walling and create side and fan lights for Comar 7 entrances.



# perform

## Specification

Comar Architectural Aluminium Systems have a Nationwide team of architectural advisors who specialise in providing architects and specifiers with project support, calculations and NBS specifications.

The relevant NBS clauses are:

- H11 Curtain Walling
- L10 Windows/Rooflights/Screens
- L20 Doors/Shutters/Hatches

## Nationwide Approved Fabricator Network

Once Comar 5 has been specified, a Nationwide network of approved fabricators ensures the successful completion of projects.
Your Comar architectural advisor can provide fabricators who specialise in commercial, new, refurbishment or public building work.

## Calculation

Calculations, such as wind-loading, U-values, size and weight limitations for projects, can be obtained from Comar's Technical Department.

## Finishes

Comar 5 finishes are available in all RAL, Syntha Pulvin and BS colours. Aluminium profiles are finished to the following specifications: silver, bronze and black anodising AA 25 to BS EN 12373-1 : 2001 or BS 3987. Liquid organic coating to BS 4842 : 1984. Polyester powder coating to BS 6496 : 1984.

## Weather Performance

On test, Comar 5 windows exceeded the requirements of BS6375 Part 1:

| | |
|---|---|
| 2000Pa | Special. Resistance to wind load |
| 600Pa | Water tightness |
| 600Pa | Air tightness |

# perform

## Thermal Performance
## Comar 5lt 45mm

| | 1.7 | | | 1.5 | | | 1.3 | | | 1.1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W1 | W2 | W3 | W1 | W2 | W3 | W1 | W2 | W3 | W1 | W2 | W3 |
| Fixed Light Internally Beaded | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.7 |
| Fixed Light Externally Beaded | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 |
| Open Out Internally Beaded | 2.6 | 2.5 | 2.4 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.2 | 2 | 2 |
| Open Out Externally Beaded | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2.1 | 2 | 1.9 |

## Comar 5 50mm

| | 1.7 | | | 1.5 | | | 1.3 | | | 1.1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W1 | W2 | W3 | W1 | W2 | W3 | W1 | W2 | W3 | W1 | W2 | W3 |
| Fixed Light Internally Beaded | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 2 | 1.8 | 1.8 |
| Fixed Light Externally Beaded | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.7 |
| Opening Out Internally Beaded | 2.8 | 2.7 | 2.6 | 2.7 | 2.5 | 2.4 | 2.6 | 2.4 | 2.3 | 2.4 | 2.3 | 2.1 |
| Opening Out Externally Beaded | 2.7 | 2.5 | 2.5 | 2.5 | 2.4 | 2.3 | 2.4 | 2.3 | 2.2 | 2.3 | 2.1 | 2 |
| Tilt & Turn | 2.8 | 2.6 | 2.5 | 2.6 | 2.5 | 2.4 | 2.5 | 2.3 | 2.2 | 2.4 | 2.2 | 2.1 |
| Reversible Pivot | 3 | 2.8 | 2.7 | 2.9 | 2.7 | 2.6 | 2.8 | 2.6 | 2.5 | 2.7 | 2.5 | 2.3 |
| Top Swing | 2.9 | 2.7 | 2.6 | 2.7 | 2.6 | 2.5 | 2.6 | 2.4 | 2.3 | 2.4 | 2.3 | 2.2 |

## Comar 5P.i 60mm

| | 1.7 | | | 1.5 | | | 1.3 | | | 1.1 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | W1 | W2 | W3 | W1 | W2 | W3 | W1 | W2 | W3 | W1 | W2 | W3 |
| Fixed Light Internally Beaded | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.7 |
| Fixed Light Externally Beaded | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2 | 2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 |
| Opening Out Internally Beaded | 2.6 | 2.5 | 2.4 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.2 | 2.1 | 2 |
| Opening Out Externally Beaded | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2 | 2.1 | 1.9 | 1.9 |
| Tilt & Turn | 2.6 | 2.4 | 2.4 | 2.4 | 2.3 | 2.2 | 2.3 | 2.1 | 2.1 | 2.1 | 2 | 1.9 |
| Reversible Pivot | 2.7 | 2.6 | 2.5 | 2.6 | 2.5 | 2.4 | 2.5 | 2.3 | 2.2 | 2.4 | 2.2 | 2.1 |
| Top Swing | 2.7 | 2.5 | 2.5 | 2.5 | 2.4 | 2.3 | 2.4 | 2.3 | 2.2 | 2.3 | 2.1 | 2 |

| | | |
|---|---|---|
| > 2.4 W/m$^2$K | Glass Centre Pane | W1 900 x 1200mm |
| 2.4 W/m$^2$K | 1.7 W/m$^2$K | W2 1200 x 1200mm |
| 2.3 W/m$^2$K | 1.5 W/m$^2$K | W3 1230 x 1480mm |
| 2.2 W/m$^2$K | 1.3 W/m$^2$K | |
| < 2.2 W/m$^2$K | 1.1 W/m$^2$K | |

All generated U-values are based on the BS EN ISO 10077-1 method of calculation using the BRE U-value CALCULATOR Version 1.07b

# perform

## System Capability and Performance
## Comar 5 50mm Resin

### Internally Glazed

| Window Type | Maximum Width | Maximum Height | Maximum Perimeter | Maximum Weight |
|---|---|---|---|---|
| Tilt/Turn | 1500mm | 1800mm | 5500mm | - |
| Horizontal Pivot | 1500mm | 1500mm | 5500mm | - |
| Side Projected | 800mm | 1800mm | - | 40kg* |
| Top Projected | 1500mm | 1500mm | - | 93kg* |
| Top Swing | 1000mm | 1600mm | - | 60kg* |
| Top Hung | 1500mm | 1500mm | 5500mm | - |
| Side Hung | 900mm | 1500mm | 4800mm | - |

### Externally Glazed

| Window Type | Maximum Width | Maximum Height | Maximum Perimeter | Maximum Weight |
|---|---|---|---|---|
| Side Projected | 600mm | 1200mm | - | 20kg* |
| Top Projected | 1100mm | 1100mm | - | 20kg* |

## Comar 5P.i 60mm

# solution

## Comar 5P.i 60mm

Internally Glazed

| Window Type | Maximum Width | Maximum Height | Maximum Perimeter | Maximum Weight |
|---|---|---|---|---|
| Tilt/Turn | 1500mm | 1800mm | 5500mm | 90kg* |
| Horizontal Pivot | 1500mm | 1500mm | - | 180kg* |
| Vertical Pivot | 1500mm | 1500mm | - | 120kg* |
| Side Projected | 700mm | 1800mm | - | 24kg* |
| Top Projected | 1200mm | 1500mm | - | 35kg* |
| Top Swing | 1000mm | 1600mm | - | 60kg* |
| Top Hung | 1500mm | 1500mm | 5500mm | - |
| Side Hung | 900mm | 1500mm | 4800mm | - |

Externally Glazed

| Window Type | Maximum Width | Maximum Height | Maximum Perimeter | Maximum Weight |
|---|---|---|---|---|
| Side Projected | 700mm | 900mm | - | 24kg* |
| Top Projected | 1100mm | 1100mm | - | 35kg* |

## Comar 5P.i Horizontal Sliding Window

| Window Type | Maximum Width | Maximum Height | Maximum Perimeter | Maximum Weight |
|---|---|---|---|---|
| Horizontal sliding window | 1500mm | 1500mm | - | 180kg |

## Comar 5lt 45mm

| Window Type | Maximum Width | Maximum Height | Maximum Perimeter | Maximum Weight |
|---|---|---|---|---|
| Side Proj 13.5mm Stack | 700mm | 1300mm | 4000mm | 24kg* |
| Top Proj 13.5mm Stack | 1200mm | 1200mm | 4800mm | 35kg* |
| Top Hung 13.5mm Stack | 1200mm | 1200mm | 4800mm | 35kg* |
| Side Hung 13.5mm Stack | 700mm | 1300mm | 4000mm | 24kg* |
| Side Proj 16.5mm Stack | 700mm | 1300mm | 4000mm | 24kg* |
| Top Proj 16.5mm Stack | 1200mm | 1200mm | 4800mm | 35kg* |
| Top Hung 16.5mm Stack | 1200mm | 1200mm | 4800mm | 35kg* |
| Side Hung 16.5mm Stack | 700mm | 1300mm | 4000mm | 24kg* |

**Maximum weights are determined by manufacturer's hardware options.*

*The above limitations are dependent on the project application. Larger or smaller sizes may be achieved. Please contact Comar's Technical Department for project-by-project advice.*

# perform

## Hardware, Glazing & Gaskets

### Hardware

Comar 5 utilises a range of hardware such as handles, locks, friction stays and restrictors. Apart from unique components, such as concealed butt hinges, all Comar window systems utilise hardware selected from standard catalogue items for Euro-groove fitting.

### Glazing

Generally, all glazing shall comply with the requirements of BS 6375 and BS 6262: 1982, British Standard Code of practice for Glazing in Buildings.

Glazing beads and gaskets allow for an exceptional range of glazing thickness from 4mm to 45mm, dependent on window system specified (see below). For commercial applications, glazing beads are fitted internally. Drainage of glazing and opening lights is an important aspect of design. Profiles have drainage slots in the glazed recess and rebated areas to ensure ventilation and drainage of the rebates as well as providing a water barrier.

Where specified, hermetically sealed double glazed units shall comply with the requirement of BS 5713 : 1979. The specification of hermetically sealed double glazed units shall be as stated in the works section.

| Glazing Options | Minimum Glazing | Maximum Glazing |
|---|---|---|
| Comar 5LT 45mm | 4mm | 28mm |
| Comar 5 50mm | 4mm | 36mm |
| Comar 5Pi 60mm | 22mm | 45mm |

### Gaskets

Glazing materials are high performance pre-formed non-structural gaskets complying with the requirements of BS 4255, Part 2.

## Security

Comar 5 has been designed to conform to the relevant industry standards, such as BS 7950 and recommends all third party hardware should hold a recognised BS 7950 certificate.

## Materials

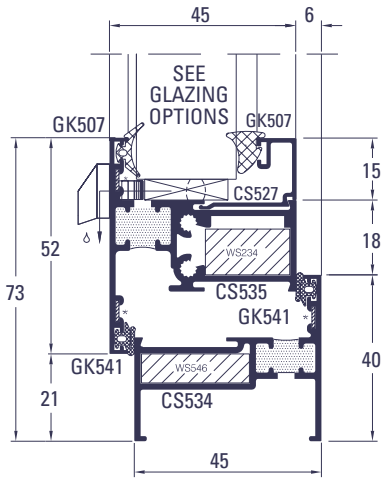
Extruded aluminium profiles are of aluminium alloy 6063 T5, T6 to BS EN 12020 and BS EN 755-1 : 1997. Comar 5P.i has a thermal barrier 20mm polyamide strip. Comar 5 and Comar 5lt are insulated with a 6mm 'poured-and-cut' thermal barrier. Gaskets are extruded from E.P.D.M. rubber.

on-time

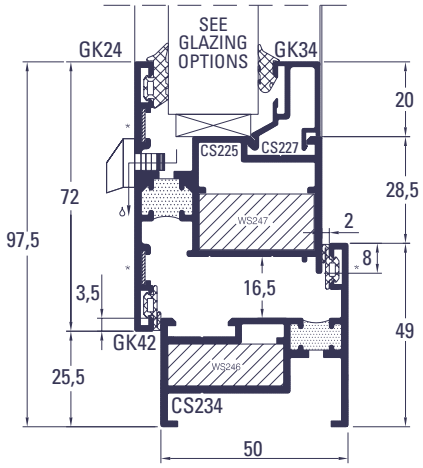
## Construction

## Comar 5 & 5lt

Multi-light transoms and mullions are secured with No.8 screws into integral ports or with cleats, with the addition of dowel pins. Fixed light frames are constructed with mitre joints with an inserted cleat which is either crimped or secured with eccentric cams.




General arrangement showing Comar 5lt, 45mm System

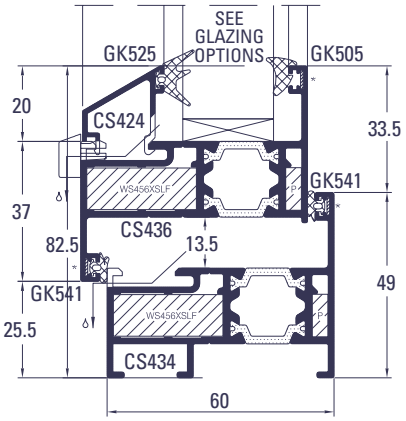



General arrangement showing Comar 5, 50mm System

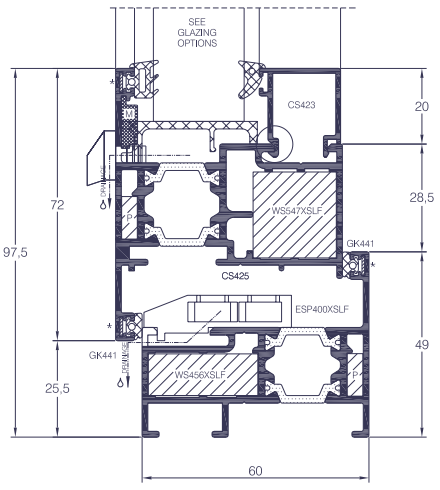
## COMAR 5P.i

Fixed light frames are constructed with mitre joints with an inserted cleat which is either crimped or tightened with eccentric cam. Multi-light transoms and mullions are secured with No.8 screws into integral ports or with cleats, with the addition of dowel pins.

For larger vent sizes an optional adjustable cleat can be inserted which provides increased strength.



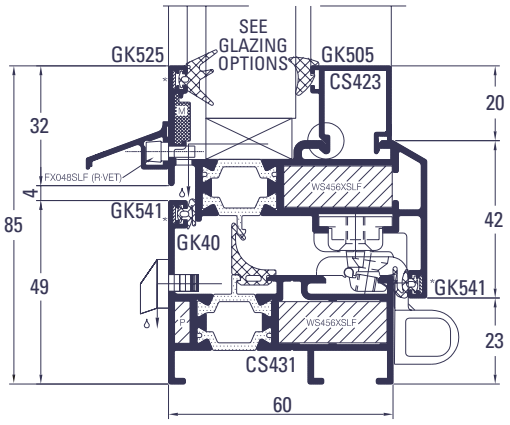

General arrangement showing externally glazed Comar 5P.i casement window, 60mm System.




General arrangement showing internally glazed Comar 5P.i casement window.

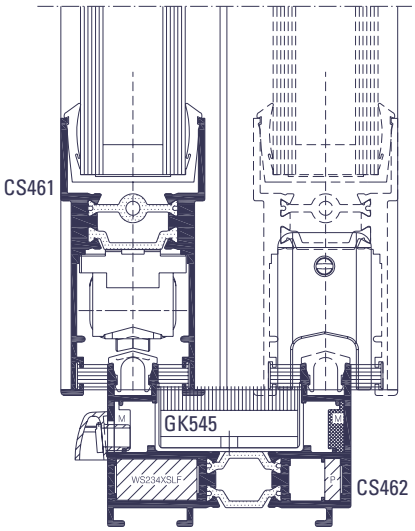
# on-time

## Comar 5P.i TBT



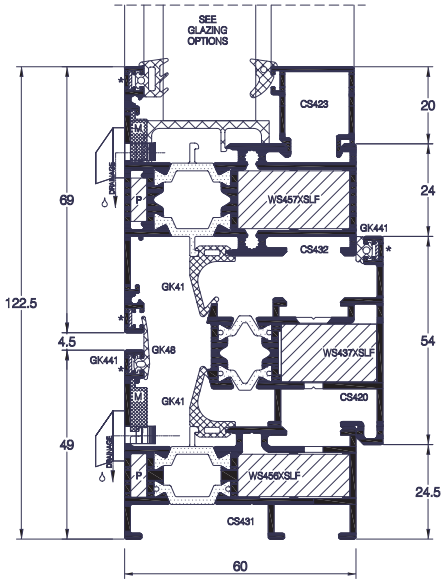

General arrangement showing Comar 5P.i tilt & turn arrangement

## Comar 5P.i Horizontal Sliding Window



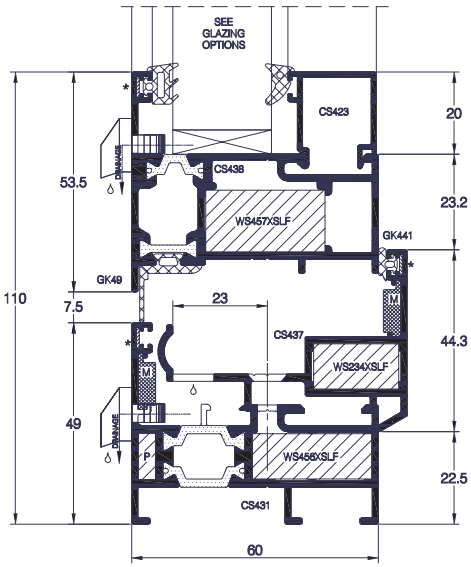

General arrangement showing Comar 5P.i horizontal sliding window arrangement

## Comar 5P.i Horizontal/Vertical Pivot




General arrangement showing Comar 5P.i horizontal and vertical pivot

## Comar 5P.i Top-swing Reversible

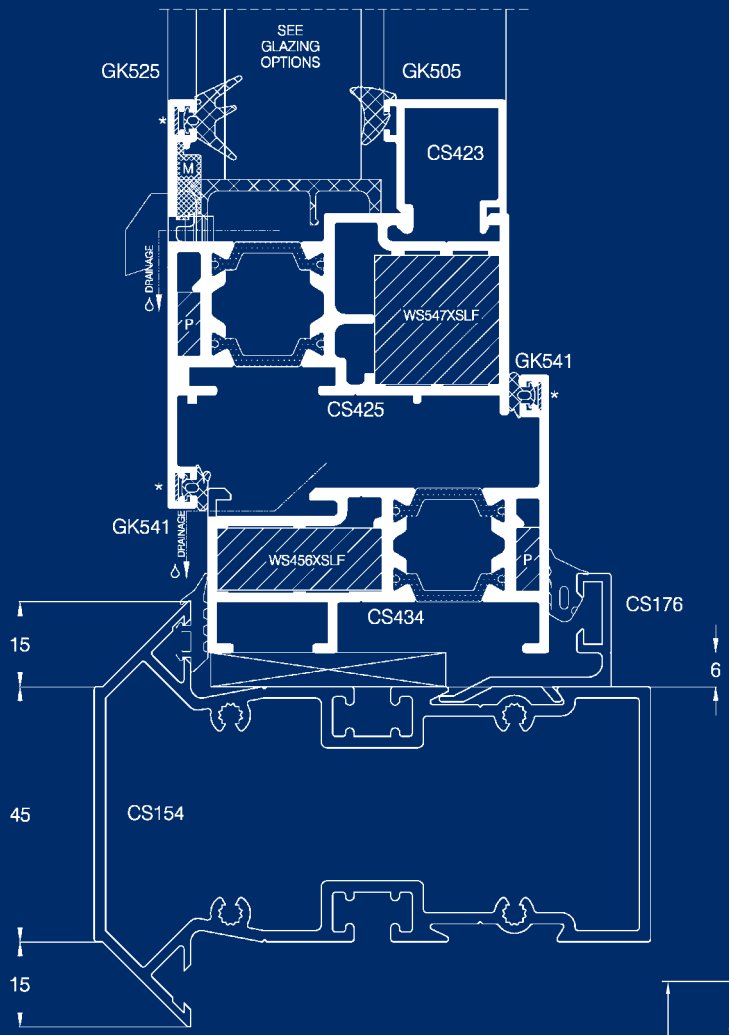



General arrangement showing Comar 5P.i, 60mm Top-swing reversible window

# on-time

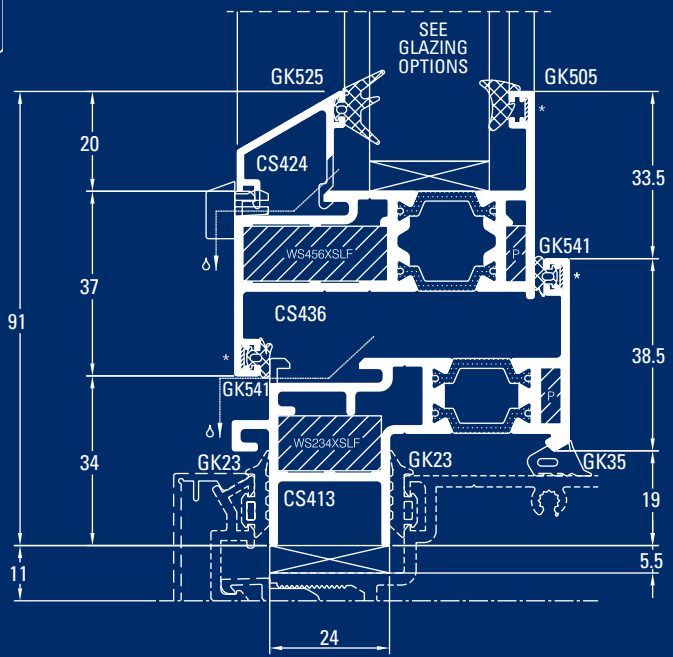
## Comar 5P.i Window System

General arrangement showing Comar 5P.i windows integrating into Comar 2 window walling to provide opening lights to a façade.




## Curtain Wall Insert

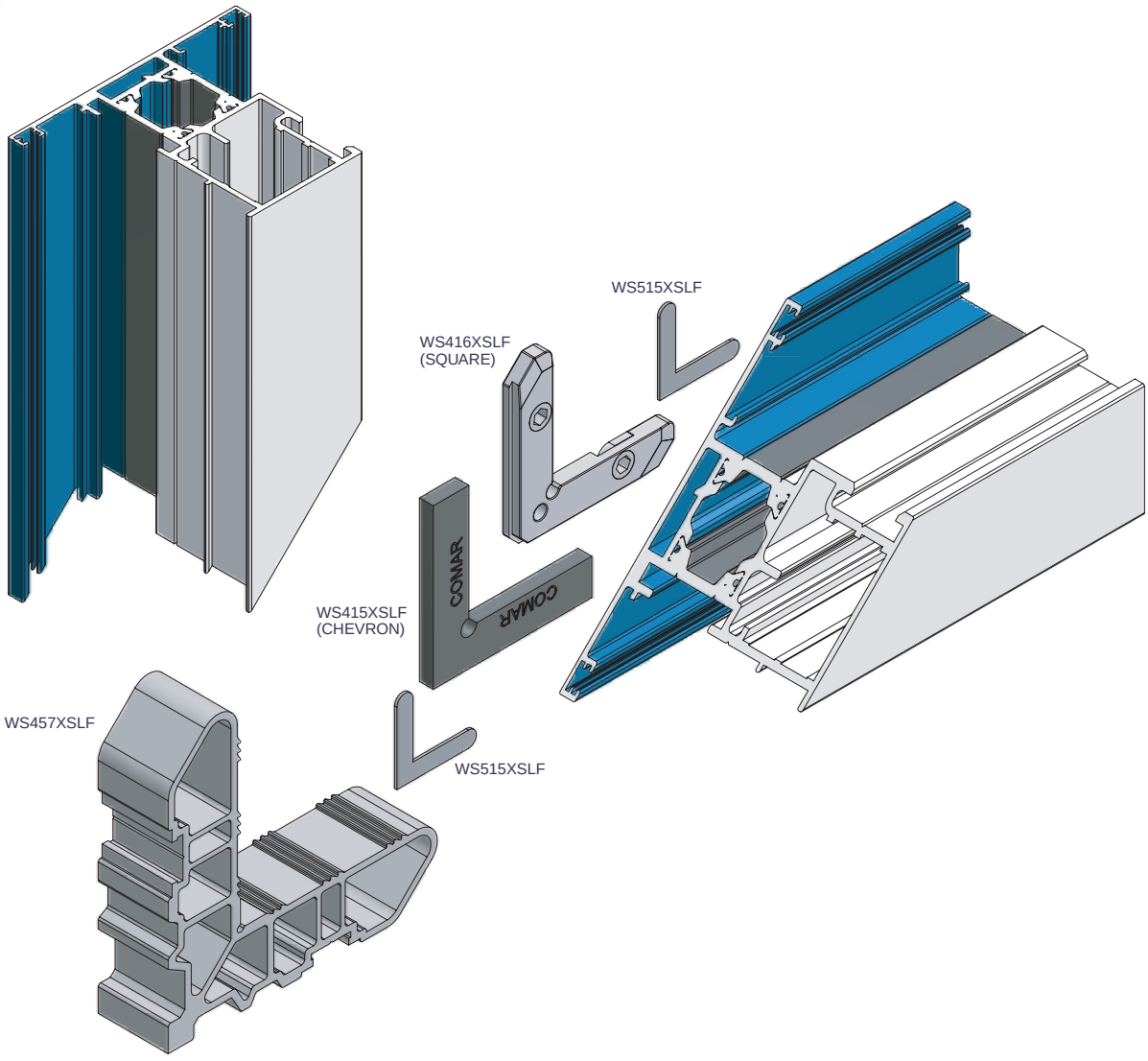
General arrangement showing Comar 5P.i windows integrating into Comar 6 curtain walling to provide opening lights to a curtain wall façade.



# on-time

## Comar 5P.i Window Vent Corner

Exploded view of heavy duty Comar 5P.i vent corner. The WS416XSLF Alignment Square ensures that a high quality finish can be achieved in a mitred corner.



# sustainable

## Sustainability

Today's world calls for us all to be more conscious of our environment. In 1998 the world recognized this by signing the Kyoto Agreement. The Kyoto Agreement directly affected the construction industry by demanding that buildings become more thermally efficient. With these demands longevity, thermal efficiency, sustainability and recyclability are now critical factors in construction.

### Why Aluminium…

Aluminium provides a unique solution for today's construction needs. Aluminium is light, strong, durable and flexible which provides tremendous potential for achieving even the most demanding design brief. Two-thirds of the energy required to extract aluminium is supplied by environmentally friendly, hydroelectric power.
Couple this with the recyclability of aluminium and aluminium is the ideal choice for windows, doors and facades.

### Longevity

Unlike some alternative building materials, aluminium offers an almost unlimited life expectancy. A notable example of this is the Statue of Eros in London's Piccadilly Circus, which has only just been cleaned and renovated, and The Empire State Building, the latter being the first building to use anodised aluminium. Aluminium does not age like other organic materials and needs no protection from ultra-violet light. Aluminium can be polyester powder coated or anodised to a variety of colours, which enhances the materials natural durability. Comar's powder coaters guarantee their finishes for 25 years and anodisers for 30 years.

### Sustainability…

The recycling process now produces high quality aluminium, which is very cost effective and can be carried out on an indefinite number of occasions without impairing the quality in any way. It is a very durable material and has very low maintenance requirements, therefore reducing the whole-life cost. It is long lasting and can withstand the ravages of the most extreme conditions. Aluminium is an excellent material to use in marine and coastal environments, as the effect of sodium chloride is minimal.

Sustainability concerns are alleviated by the knowledge that we have at least 300 years of known reserves of the raw material, Bauxite, and this does not allow for the fact that 70% of all aluminium used is recycled at the end of its product life.

Thus, with ever increasing proportion of re-cycled material in use, aluminium can be accurately described as the ultimate sustainable material.

### Recycling Check List

*"The recyclability of aluminium – one of its unique properties along with strength, durability and corrosion resistance – has led to its increased use in construction over recent years. Used aluminium is valuable and is easily and endlessly recycled without quality loss.*
*The material is very rarely 'lost' entirely because of this."*

Important issues to note are:

- The quality of aluminium is not impaired by endlessly recycling
- Re-smelting aluminium saves up to 95% of the energy needed to produce the primary product
- It is the most cost-effective material to recycle
- The overall market for used aluminium is steadily growing, so the more aluminium there is in a product, the more chance it has of being re-cycled
- The recycling rate of used aluminium products in building is over 80% (over 95% in transportation and 30% in packaging)
- 30% of the 1.9 million tonnes of aluminium used in Europe in 1997 came from recycling

*Source: Council for Aluminium Building & The European Aluminium Association.*

## Standards

| | |
|---|---|
| BS-EN ISO 9001: | Comar is an ISO 9001 registered firm, certificate number: A0852 |
| BS-EN 755: | Aluminium alloy extrusion |
| BS-EN 485: | Aluminium alloy sheet |
| BS-EN515: | Aluminium and aluminium alloys – Wrought products temper designations |
| BS 4255 Part-1: | Gaskets |
| BS-EN573-3: | Aluminium and aluminium alloys – Chemical composition – Wrought products – part 3 |
| BS-EN755-2: | Aluminium and aluminium alloys – Extruded profiles – part 2: Mechanical properties. |
| BS-EN755-9: | Aluminium and aluminium alloys – Extruded profiles – part 9: Profile tolerances. |
| BS-EN12020-1: | Aluminium and aluminium alloys – Extruded precision profiles – part1: inspection and delivery |
| BS-EN12020-2: | Aluminium and aluminium alloys – Extruded precision profiles – part 2: tolerances on dimension and form. |
| BS 4873: | Specification for aluminium alloy windows. |
| BS 6375 Part 1: | Classification for weather tightness. |
| BS 5713: | Hermetically sealed flat double glazed units |
| BS 6262: | Code of practice for glazing of buildings |
| BS 6496: | Specification for powder organic coatings to aluminium alloys for external architectural purposes |
| BS 1615: | Method of specifying anodic oxidation coatings on aluminium and its alloy |
| BS 3987: | Specification for anodic oxide coatings for external architectural purposes |
| BS 6399 Part 2: | Code of practice for wind loads |
| C.W.C.T. | Centre for Window & Cladding Technology |

## Technical Back-Up

An experienced Sales Team covers the UK while the Technical Department offers an unsurpassed design and installation advice service to designers, specifiers and fabricators; Simply call: +44(0) 20 8685 9685

## For More Information

To find out more about this or any other Comar Architectural Aluminium System, or to obtain your personal copies of the COMAR TECHNICAL MANUALS call: +44(0) 20 8685 9685 or fax on: +44(0) 20 8646 5096

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