

## ECMWF Data Centre Case Study

### **Always bring the weather with you...**

There's power in the weather. On a micro-level, the weather dictates everyday decisions like travel, choice of activities, and clothing. On a macro-level, forecasts can form the very foundations for sustainable economic progress and the strategic outlook for safety and security. In essence, the weather has the power to determine how we live our lives.

The European Centre for Medium-Range Weather Forecasts (ECMWF), based in Reading, UK, and now with 360 staff across more than 30 nations, is a research institute and 24/7 operational service producing global medium-range numerical weather predictions and other data for its member states. Following its core mission to produce medium-range numerical weather forecasts and carry out scientific and technical research, the Centre plays an integral, if not completely vital, role in providing meteorological data to almost the entirety of the European continent.

Producing numerical weather forecasts is a computationally expensive process, taking in data from satellites, weather balloons, buoys, and radars to predict every kind of weather imaginable, and this requires exceedingly large supercomputers to both drive this incredible data intake and also perform necessary analysis. Thus, to cater for the increased need for data processing, the ECMWF decided to open in 2016 an international competition for bids from the ECMWF member states to host a new data centre.

The bid from Italy, which proved to be the competition's winner, was put forward by the Regione Emilia Romagna (R-ER), focused on bringing the proposed data centre to the city of Bologna and leveraging on the synergies with Tecnopolo di Bologna planned developments. Designing a whole new data centre is a huge task and it was clear from the outset the design concept for the project would be incredibly important in showcasing the benefit of the project.

Studio TI who produced blueprints for the different data centre components, worked closely with global grooved mechanical pipe joining solutions specialist Victaulic to create the design concept for the data centre's cooling system. As a result of processing thousands of pieces of information a second, data centres build up an enormous amount of heat. Ensuring Italian bid could remedy that heat safely and securely was always going to be a crucial piece in the overall puzzle.

### **Bologna: a city with a data heritage**

In the words of the Italian Minister for Environment Gian Luca Galletti, Bologna is a pole of environmental data which shapes the heritage of the city. Housing the new data centre and allowing the ECMWF to continue its important work in studying and predicting weather phenomena is a responsibility Galletti said the city would "surely honour". So, it was no surprise that when the ECMWF released plans for a new data centre, Italy championed Bologna for its bid.

At the very start of the design process, Studio TI approached Victaulic to bring its appetite for innovation to this demanding project. Taking this lead, at a very early stage, the mechanical pipe joining specialist employed its Virtual Design & Construction (VDC) services to draw up 3D models of its proposed piping system.

Ing. Lanfranco Ricci, Mechanical Systems, Studio TI, praised Victaulic's proactive approach, stating: "The positive approach Victaulic took to this project was fantastic to work with. From the offset they understood what was required for the project and how best to produce a system which keep the

data centre cooled and the weather forecasts running. A particular benefit was being able to use their digital prowess to build 3D design concepts.”

### **Keeping the weather forecasts running**

The site chosen for the new ECMWF data centre was the new Tecnopolo di Bologna, a 13-hectare space for public and private research facilities built on redeveloped unused buildings and the grounds of a former tobacco factory. However, the piping system created by Victaulic involved the use of prefabrication offsite. Victaulic understood that by prefabricating the system could ensure the highest level of reliability through greater quality and level of control and ultimately convinced the contractor Gianni Benvenuto S.p.A to opt for initially building offsite and installing later.

By working with Victaulic, Studio TI, and in turn the overseeing contractor SITE, were in the fortunate position of having a partner it could almost let run the cooling aspect of the project. Victaulic operate to be more than simply a manufacturer and supplier to their clients: the company also acts as a consultant. Victaulic produced the pipe designs, provided the products and were onsite to oversee and guide the construction team in how to best operate their products.

One of the key reasons for choosing Victaulic products is the scalability for future system changes or expansion and the improved reliability compared to traditional solutions. Furthermore, a primary factor for the contractor’s choice to work with Victaulic was the simplicity and speed of installation provided. As a result of Victaulic’s Installation-Ready™ technology, which only requires two bolts and nuts to be tightened, installation can often be up to seven times faster than traditional methods: a valuable saving of time and resources for any project lead.

This solution also paves a way forward for the future of existing data centres: expansions required in the coming decades to process more information can be undertaken without the use of fire – evidently a huge hazard for data centres – which are necessary for methods such as welding and brazing.

In total, for the mechanical room, technical tunnel and distribution of air to the computer room air conditioning units, more than 8600 couplings, 2400 fittings and 990 valves were installed, ranging from DN40 on the smaller scale to DN350 at the larger end.

Matteo Vecchiato, Sales Engineer, Victaulic said: “Bologna is a proud city; one which sits at the vanguard of progress. It was a pleasure for us to work with Studio TI and Gianni Benvenuto on this project and to deliver a data centre which will not only propel the city forward but provide ECMWF member and co-operating states with vital weather data so they can plan and prepare for the challenges ahead.

“There’s no question data centres are set to play a key role in the future of digital infrastructure. We see further dependence on data centres continuing throughout 2021 and beyond, with more data centres going out to tender. We urge all companies starting their process towards a new data centre to look at the example set by data centre at Tecnopolo di Bologna premises: to assess the options and partner with trusted experts.”